The Chemical Age

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Other communications relating to advertisements or general matters should be addressed to the Manager.

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The Newcastle Meeting

THE arrangements for the Annual Meeting of the Society of Chemical Industry, which begins in Newcastle on Tuesday next and concludes on the following Saturday, promise from every point a series of very successful conferences. The one subject for regret is the temporary illness of Mr. Gray, the President, which will deprive the conferences of his genial society and inspiration, but in the circumstances the best possible substitute is available. The members visiting Newcastle may count on a cordial welcome, for the local committee have left nothing undone to provide for their comfort and entertainment. The committee have wisely decided to fit the subjects for discussion in with the industries of the districts, and the visits to various works will be of great interest and value as illustrating many of the points under discussion and as examples of applications of chemical and engineering science to industrial enterprise. It will be seen from the programme how important a part in the Annual Meeting the Chemical Engineering Group now takes. The important subject of "filtration" will be dealt with by experts from various points of view, and here again members will have the advantage of seeing the actual apparatus at work. The social side has been as usual liberally provided for, and those who are able to make the journey to Newcastle may be assured of a pleasant and profitable week.

In every respect except one the Society may congratulate itself on steady development and progress. The single exception is in the matter of finance. The difficulty here is not due to any action on the part of the Society itself, but to the new conditions which have arisen in consequence of the war. The expenditure for the year ended December 31 last amounted to £24,516. 18s. 2d., as compared with £19,113. 14s. 3d. for the previous year. The income fortunately shows a substantial advance—from £15,968. 13s. 6d. to £22,163. 14s.—but unfortunately it is still £2,353. 4s. 2d. short of the expenditure. The position is improving in the sense that the loss in 1919 was £791. 16s. 7d. less than in 1918. At this rate of improvement, however, it would take some years to make the income equal the expenditure, and to avoid a continual draft on reserves the Council have wisely decided to ask the members to make the Society self-supporting by paying an increased subscription. The amount of the increase will, no doubt, be felt by many, but it is pretty safe to say that it can be met by all without hardship, and this equal distribution of the loss over the whole membership should put the finances of the Society once more on a satisfactory basis. No doubt there will be expressions of regret at the necessity for increasing the subscription, but we think the members will recognise that it is a necessity and loyally support the Council.

The Origin of the Elements

THERE comes a time in the history of every branch of science when some particular problem is ripe for solution. During the last few years the relationship of one element to another has attracted a good deal of attention, and this subject has been approached from many sides, chemical, physical and mathematical. The brilliant researches of Rutherford, Soddy, Moseley, Aston and others could hardly have been possible but for the earlier work of Crookes, Ramsay and the Curies. The constitution of the atom is becoming known to us gradually and the time is fast approaching when some logical explanation of the known facts will be possible.

We are tempted to these philosophical reflections by the perusal of a paper by Dr. Vincent recently read before the Physical Society on "The Origin of the Elements," a paper which is largely concerned with

considerations of the relationship between atomic weights and atomic numbers. This subject is one which has already received attention in our pages, and the recent article by Dr. Miall and the subsequent correspondence by Professor Soddy and others will be in the minds of our readers. It is gratifying to our national pride that in the realm of purely theoretical chemistry Britain has played a very prominent part. Germany may claim Lothar Meyer and Russia may claim Mendeléeff, but we have Prout, Dalton, Newlands, Moseley and Crookes, and a goodly band of living experimenters.

In our pages we hope to deal occasionally with such matters, and from time to time to venture again into this fascinating field of speculation and investigation. Research which appears at first sight to be far removed from the practical needs of mankind sometimes turns out to be of considerable industrial and commercial importance. Who would have thought that minute investigations of a number of rare Scandinavian minerals would have laid the foundations of the gas mantle industry? Dewar's high vacuum work gave us the thermos flask, Hertzian waves have made a revolution in peace and in war. We trust that Dr. Vincent will continue his researches, and that as the nineteenth century settled the Origin of Species, so will the twentieth century explain the Origin of Elements.

Power Alcohol

WITH every prospect of transport rates and passenger fares rising above their present levels, it becomes more and more imperative that some cheap form of liquid fuel should be developed. There seems little likelihood of petrol coming down in price so long as the demand exceeds the supply, and the only alternatives to which we can turn are home-produced benzol and power alcohol. About twelve months ago great hopes were entertained of benzol, but the position has been completely changed by the refusal of the Parliamentary Committees which have recently been dealing with the Gas Regulation Bill to enforce the recovery of benzol from coal gas. The motorist probably has never quite understood the fact that, in order to make a profit out of the process, not even the largest gas undertaking can afford to sell "stripped" benzol at the price prevailing to-day, particularly when consideration is given to the fact that town's gas is in the future to be sold on a thermal instead of on a volume basis. The result is that the benzol which will be available for fuel purposes will be no more than that washed from coke-oven gas and produced from tar. As the quantity derived from these sources must necessarily be trifling compared with the total consumption of petrol, it would seem that the one remaining hope now lies in the development of power alcohol.

Sir John Fowler, in *The Times Trade Supplement*, insists that the production of power alcohol is not a question which admits of being dallied with, and unless a decision is arrived at quickly this country will be forestalled in overseas markets for the raw materials for the manufacture of alcohol. The reasons why the use of power alcohol has not progressed in this country are—Customs and Excise restrictions, the cost of production, apathy and want of foresight on the part of the Government, and regulations strangling the initiative of producers. Most unfortunately, from the point of view of its use as a fuel, alcohol is also an essential component of the beverages from the taxation of which considerable revenue is derived. Sir John says that, to give our industries the benefit of a competitor with petrol, all that is required is that a suitable denaturant be approved, that any duty on import should be removed, and that the regulations for the distribution and use of power alcohol should be as inexpensive and as free as is compatible with reasonable protection of revenue and safeguards against misuse. It is essential that the regulations shall be drawn up in a broad-minded spirit by practical men, and not made so irksome as to defeat the whole object of giving us cheap liquid fuel.

From the point of view of actual manufacture there are, of course, still many problems to be settled. For instance, as we do not appear to possess sufficient raw material of our own, the question arises whether it would be preferable to import the raw material or the finished product. In support of the latter alternative it is pointed out that overseas, where the raw material is available, transport of alcohol in tank wagons and tank steamers is a simple matter compared with the shipment of bulky grain or roots.

Sulphate of Ammonia and Free Acid

MR. SHEARD'S article dealing with the effect of free acid in sulphate of ammonia, which we published in our issue of July 12, has produced a rejoinder from Mr. F. C. O. Speyer, the General Manager of the British Sulphate of Ammonia Federation. Mr. Sheard, it will be remembered, contended that, in spite of a very prevalent opinion, free acid in the sulphate does not tend to attract moisture. His experiments clearly led him to conclude, in fact, that, whether containing 0·5 per cent. of free acid, 0·16 per cent., or no acid whatever, the salt absorbs moisture from a wet atmosphere and gives it up to a dry one. Mr. Speyer, on the other hand, contends that this conclusion is wrong, and that it is only possible to dry sulphate containing practically no free acid. This view is backed up by the practical experience gained in shipping sulphate in 100-ton lots to tropical countries, with proportions of free acid ranging from 1 to 1½ per cent. Moreover, he states that all the evidence so far produced on a large and practical scale shows that the lower the percentage of free acid the better the mechanical condition and the less the damage done to the bags; and that there is a rapidly growing demand for acid-free sulphate of ammonia both at home and abroad, which, temporarily at any rate, appears to have over-reached the supply.

It would be most unfortunate if Mr. Sheard's findings were to cause manufacturers to hesitate to incur the trouble of producing a neutral salt; but we believe that all makers are now so fully alive to the higher commercial value of such a salt that they would scarcely be influenced by a provisional suggestion arising from experiments conducted on a small scale. Whether free acid attracts moisture or not, there seems to be no question that it has a decidedly harmful effect on the bags. As the matter stands, it would merely appear that the article in question has raised a

debatable point which might otherwise have never been troubled about, and which should now be substantiated or refuted by further work. Herein lies the value of suggestions raised by independent writers in articles contributed to the technical press. Contradictory views of the kind at least lead to progress, and stimulate further research on problems the solution of which is too often taken for granted.

A Tribute to Lord Moulton

THE dinner arranged to be given to Lord Moulton at the Savoy Hotel on Wednesday, July 21, will be a pleasant acknowledgment of the valuable work done by him during the war, and for many years before the war as perhaps our first authority on Patent Law and in many other public capacities. During the war period Lord Moulton became very intimately associated with chemical science and industry as Chairman of the Committee on Chemical Products, as Chairman of the Committee on High Explosives, and later as Director General of Explosive Supplies in the Ministry of Munitions. Familiar as he was already, as a great Patent lawyer, with the work of chemists, his later experience gave him a still fuller insight into the immanence of chemical science throughout the whole range of national industry. No one could have recognised in more generous terms the nation's indebtedness for the final victory of the Allies to the work done in the laboratories and in the chemical works of this country. It is due, in fact, to Lord Moulton as much as to any single public man that the nation has come to recognise the part that chemistry plays in the life of the nation and that chemists themselves are beginning to realise the national value of their own work. Not only in connection with the production of explosives has Lord Moulton done excellent work. In the organisation of a new home dyestuffs industry he has helped enormously, on the one side by impressing upon the Government the vital importance of establishing a self-dependent dyestuffs industry, and on the other by appealing to the industry itself to equal at least, if not excel, the initiative, enterprise, and especially the collective action of German dyestuffs manufacturers. These public services appeal especially to the chemical profession, and account for the decision of leading members of the profession to acknowledge them in this pleasant social fashion. The dinner, we understand, is likely to attract a distinguished company, and possibly the occasion may be utilised for making some public announcement respecting the scheme for establishing a chemical headquarters in London.

German Chemical Trade

REPORTS from Berlin indicate that German chemical firms are finding the marketing of their products abroad more profitable than at home. Domestic consumers consequently suffer, and have to put up with indifferent terms of delivery. The recent stagnation of business, affecting practically all German industries, has dealt the chemical industry a blow. Notwithstanding this, the fact remains that most of the chemical companies have done very well during the past year. The returns of the Badische Anilin und Sodafabrik show a net profit of 27 million marks, as compared with 10·85 millions last year, the dividends being 18 per cent. (12 per cent. in the previous year), while the Farbenfabriken vorm. Friedrich Bayer & Co., at Leverkusen, earned 29·1 million marks, against over 13 million i the previous year, and also distributes 18 per cent., as compared with 12 per cent. the year before. The Chemische Fabrik J. D. Riedel A.-G., Berlin, will probably distribute 16 per cent., plus a bonus of 10 per cent., against a total of 16 per cent. in 1918. The Chemische Fabriken vorm. Weiler-ter-Meer show a profit of 2·58 million marks (1·15 millions in 1918) and a dividend of 12 per cent., as compared with 10 per cent. in the previous year, has been proposed. The Chemische Fabrik auf Aktien, vorm. E. Schering, Berlin, has not done so well as was generally expected, but has declared a dividend of 18 per cent. on common and 4½ per cent. on preferred stocks. The Farbwerke vorm. Meister Lucius und Brueningh, at Hoechst (on the Main), has increased its profits from 14·96 million marks to 24·2 millions, and declared a dividend of 14 per cent. (12 per cent. in 1918), while the A.-G. für Anilin-fabrikation, Berlin, distributes a dividend of 18 per cent., against 12 per cent. in 1918; Chemische Fabrik Griesheim-Elektron, at Frankfort, 12 per cent. (7 per cent. in 1918); the A.-G. für Chemische Industry, at Gelsenkirchen-Schalke, 25 per cent., against 16 per cent.

Chemical Traders and Excess Profits

WE are glad to see that the Chemical and Dyestuffs Traders' Association have joined with the other commercial interests of the nation in putting before the Chancellor of the Exchequer the grave effects on industry of the continuance, still more any increase, of the Excess Profits Duty. As the Chairman of the Executive Council points out to Mr. Chamberlain, the Association, representing an important section of traders engaged in importing, exporting, and distributing, is in a favourable position for gauging the effects of the tax, and their view is that it " penalises enterprise, perpetuates high prices, discourages maximum production, encourages extravagance, places British traders at a serious disadvantage in competition with foreign traders not subjected to such a handicap, and acts as a severe restraint on trade and on supplies at a time when national interests urgently call for increased trade and plentiful supplies."

Recognising, however, that the tax may have to remain for another year, the Association urge as an alternative to its immediate withdrawal (1) that the rate should not be increased, (2) that special consideration should be given to firms and companies with a low pre-war standard with a view to bringing such standard into accord with the present relative value of money, and (3) that similar consideration should be given with regard to the salaries paid to managing partners or managing directors.

The Calendar

July 10	Physiological Society: Papers by J. B. Leathes, H. C. Broadhurst; J. Barcroft, F. J. Roughton; S. P. L. Sorenson, E. J. Cohn; A. Krogh. 4 p.m.	Physiological Laboratory, University, Oxford.
13–16	Annual Meeting of the Society of Chemical Industry	Armstrong College, Newcastle.
13–14	Chemical Engineering Group, Fourth Conference: " Filtration."	Newcastle.

Society of Chemical Industry

Notes on the Forthcoming Annual Meeting at Newcastle

The Annual Meeting of the Society of Chemical Industry begins on Tuesday next, July 13, at Newcastle-on-Tyne, and concludes on the following Saturday. We give below some preliminary notes on the arrangements for what promises to be a thoroughly successful meeting.

NEWCASTLE, although not so large and important as other centres of chemical industry such as Manchester, Birmingham, &c., is yet a very busy spot, and what it lacks in chemical factories, it makes up for in its coal industry, shipbuilding and metallurgical industries.

The local committee—with Professor P. P. Bedson at its head—has arranged the annual meetings so as to pivot round coal in its coking aspect, with metallurgy thrown in as an important side line. The coking of coal will form the subject for discussion on Tuesday afternoon and visitors will have opportunities of seeing the coal won from the earth at Ashington; of seeing coal turned into metallurgical coke under up-to-date conditions at Marley Hill, where, in addition, the recovery of benzol, toluol and solvent naphtha, ammonia sulphate, &c., is practised. At the Newcastle Alloy Co.'s works at Rowlands Gill, the utilisation of the waste heat and gas from coke ovens is attained by the production of electricity, which energy in turn is used in the manufacture of ferro-alloys and of cuprous oxide.

On the metallurgical side, Wednesday morning will be devoted to the consideration of important papers on brass, electric furnaces and chemical sheet lead, and visits are to be paid during the week to the Tharsis Co.'s copper works, Palmer's Ironworks and Messrs. Cookson's white lead and lead oxide works. An endeavour has been made by means of an exhibition to show some of the products of local industry.

The social side of the week is well provided for; our esteemed Lord Mayor is giving civic sanction to our proceedings and will entertain the members at a reception. The members of the Newcastle section are acting as hosts at a luncheon and conversazione, and to wind up the local Chemical Industry Club (the only one of its kind in the provinces) is arranging a social evening in the Club-rooms.

Friday will be devoted to a most interesting motor tour *via* the lovely Derwent valley to Hexham, where the journey will be broken for half an hour to allow of the inspection of the Abbey there. Luncheon will be served in a marquee at Chollerford and the remains of one of the largest and most perfect Roman camps at the Chesters (Cilurnum) will afford an opportunity for the imaginative to conjure up visions of life two thousand years ago.

The newly formed Chemical Engineering Group will hold conferences on the important subject of filtration, when the latest methods of separating liquids from solids will be dissected and thrashed out.

The local committee have had by no means an easy task—following as they do the extremely successful meetings in London, of 1919,—and their best thanks are due to all who have helped—from the guarantors, the firms who have thrown open their works to inspection, the readers of papers, the authorities of Armstrong College, and the Tyne Improvement Commissioners, down to the very willing band of helpers who have assisted in various ways. We can say already that the meetings will be a success, and should any readers be in any doubt as to whether they can manage Newcastle, 1920, we should unhesitatingly say—"Try hard, it will be worth it."

H. D. S.

Chemical Engineering Group

By a Chemical Engineer

THE Fourth Conference of the Chemical Engineering Group, fixed for Tuesday afternoon, July 13, and Wednesday morning, July 14, during the annual general meeting of the Society of Chemical Industry in Newcastle-on-Tyne, bids fair to excel in interest and importance the three Conferences previously held under the same auspices. The subject to be discussed—Filtration—is one which touches a vast range of industries, and is capable of being treated in a variety of ways, which depend ultimately upon the exact meaning to be given to the term. In general practice, and following a very usually accepted definition, the word ordinarily connotes the separation of "solid" matter from "liquid" in which it is suspended by the forced passage of the liquid through a porous septum brought into contact with the mixture. This is the definition illustrated in its practical application by the use of the funnel and filter paper or filter bag in the laboratory, and translated into large scale practice in the filter press and the various types of continuous filter so extensively used in America.

As thus defined, the term "Filtration" serves to denote the majority of separatory operations of this nature met with in industry, and the typical plant for its performance is, undoubtedly, the filter press. It is natural, therefore, that a paper on "Recessed Plate and Plate-and-Frame Types of Filter Press" should be down for reading and discussion, and the reputation and experience of the author—Mr. E. A. Alliott—is sufficient guarantee that his contribution will be informative and authoritative. Indeed, from the abstract published in the programme of the conference and from a rather fuller summary that we have been permitted to see, we have no hesitation in saying that Mr. Alliott's paper will be instructive and useful to many whose familiarity with the filter press has doubtless led to contempt for the idea that anything novel can be put on record regarding the construction and use of what is apparently such a simple piece of apparatus. It is within our experience that many users of the filter press have only the haziest notions of the economic or commercial side of its employment—questions of size and capacity, influence of physical conditions, labour required for operation, &c., scarcely ever being considered—and we are of opinion that many of the data to be brought forward will stimulate users to take a greater interest in the possibilities of the plant they have at work. It is to be hoped that the quantitative data mentioned in the abstract—much of which has not before been published, if accumulated—will be extended and issued as opportunity offers. It is very desirable to create interest in the filter press from the user's side, as that way improvement lies, and whatever opinion one may have on the developments in design associated with American practice, there can be no question that the mainspring of such developments is what we have stated.

The choice of a proper filtering medium, which Mr. Alliott intends to discuss, leads us to remark that this has often very little relation, as regards porosity, to the average size of grain of the solid matter it is intended to separate. We believe Mr. Hatschek was the first to draw attention to this, and doubtless he will elaborate the point in his paper on "The Principles of Technical Filtration," which will be read on the day preceding Mr. Alliott's paper. We understand that Mr. Alliott has some interesting microscope slides and photomicrographs to exhibit which illustrate this in a surprising degree; and it is well that the matter should be expounded as fully as possible. The point arises in other guise during the washing of cakes in a press, and it is scarcely an exaggeration to say that "washing" is one of the least understood and least efficiently conducted operations in the average chemical, or other, works where a press is installed.

As we have already said, the use of the filter press represents the factory solution of the problem of filtration, as first defined, but when the separation has to take account of the tendency of many ordinarily solid bodies to merge the identity of their solid-liquid interface in the substance of the surrounding liquid menstruum—when, in fact, the solid tends to become "colloidal," the ordinary filter press ceases to function, or does so uneconomically and with difficulty. Such an occurrence is by no means infrequent, as many substances which are easily filtered whilst contaminated with the mother liquor, develop colloidal tendencies as this liquor is removed by repeated washing with the pure solvent. This experience is common in the laboratory, and not less so on a large scale. In many such cases other physical properties besides definite

spatial extension can be utilised to assist in separating the "colloidal solid" from its surrounding liquid, and a method which is applicable in such cases, depending upon the specific electrostatic properties of most colloidal substances, is to be described by Dr. W. R. Ormandy in his paper on "The Filtration of Colloids." The paper is to describe in the main the pioneer work of Count Schwerin and the practice of the Osmose Co., and we feel sure the results obtained, *e.g.*, in china clay separation and filtration, will astonish those who have experienced nothing but difficulties when trying to work with colloidal materials in an ordinary press. We are pleased to note that the author will illustrate his paper by appropriate experimental demonstration, and it is satisfactory to reflect that such illustration can be extremely striking. The modified filter press, with its electrostatic equipment, is a very powerful additional weapon in the hands of the chemical technologist, and will in time doubtless find many applications other than its present field of usefulness in clay separation.

The papers remaining for consideration can be divided into two main categories: (1) Those dealing with centrifuges, and (2) other papers. Taking the latter class first, we are led to describe a paper by Mr. Balfour Bramwell, on "The Design of Mechanical Filters." The problems for which filters of the kind referred to are required are most usually such as will not be encountered in average technological practice. It must not be forgotten, however, that the use of mechanical filters in the serving of communal needs for a pure water supply almost invariably solves the problem for the industrial user, and it is rarely that the latter has to grapple with the very special difficulties involved. Occasionally this has to be done, as in the case with the huge explosives factory erected at Gretna during the war, and also in the case of some of the largest explosive and other chemical factories in ordinary work. The problem is much more frequent abroad, and doubtless Mr. Bramwell's contribution will be of extreme interest and use to many. The essential point about filters of the kind to be described is that they shall give efficient service at very little cost, whilst dealing with immense volumes of liquid, and a great many devices have been brought forward at different times to effect the desired ends. The "turn-over" filter, with which Mr. Bramwell is more particularly connected, is ingenious in conception and execution, and appears capable, in the smaller sizes, of fairly extensive employment in chemical manufacture.

The paper on "Air Filtration" by Mr. J. M. Brown, deals with a subject about which very little exact data is available, and if Mr. Brown can add even in small degree to existing knowledge, his efforts will be welcome. The question of air (and gas) filtration has many surprising ramifications, and although in the nature of things Mr. Brown's experiments can only deal with a very limited field, they will come with the progressive force of original work, and will be correspondingly valuable.

The other class of papers previously mentioned comprises three contributions dealing with centrifuges: "The Sturgeon Centrifuge," by Mr. R. A. Sturgeon; the "Centrifugal Separator," by Mr. W. J. Gee; and the "Sharples' Supercentrifuge" by Mr. S. H. Menzies. In the strict sense of the word, not one of these machines is an apparatus for "filtration," but rather for "separation," "subsidence," or "clarification." Only one of the three—the Gee Centrifugal Separator—endeavours to attain what may be termed "filter clarity" of effluent, which it does by employing a porous septum as does the filter press. The other two, and to an equal extent also the Gee machine, are subsiding tanks, in which the enormously accentuated body forces due to rapid rotation are used to replace the force of gravity or static pressure. It is natural to expect therefore, that the field of application of the machines in question is different from that of the filter press, and to a large extent this is so. Not entirely, for the Sharples machine, the Gee separator, and to some extent, the Sturgeon centrifuge, can function equally well with the filter press in giving a clear effluent. At the present time, the three types of machine find their most important uses in dealing with mixtures containing only small percentages of solids, *i.e.*, for the most part waste effluents and the like. To give an example, the Sturgeon centrifuge has been used for recovery of grease from wool scourings, the Gee separator for treating the effluent from a paper mill, and the Sharples machine for recovery of valuable oil from the settlings and sludge of oil storage tanks. The fact that these three machines are essentially continuous in operation—up to the limit of the solid capacity of the drum in the case of Sharples and Gee, and entirely so in the case of Sturgeon—at once marks them out for dealing with large volumes of working substance, and thus settles their initial sphere of utility in the treatment of waste. A further use of the Gee and Sturgeon machines is in "grading" of separated solids according to size, and it would be interesting to compare the operation of these machines with the Osmose machine in, for example, the treatment of china clay. Doubtless this point will arise in the discussion on one or other of the papers concerned.

The Sturgeon machine appears unique in being entirely continuous and automatic in action, and it must be confessed that the means whereby this is effected are in the highest degree ingenious. Such a machine will increase output and cut down labour cost to an unprecedented extent, and continuity of process with minimum of attention is undoubtedly the ideal of all productive effort. It is pertinent to inquire whether or not such an ideal can only be obtained when treating waste, as only has been done hitherto with the machine in question. It should quite easily be possible to adapt the machine to filter and wash continuously and automatically practically all the substances upon which such operations have to be performed, and it would be interesting to know if the author has any experience of this nature. There are a great many manufactures in which, during filtration, "filter clarity" is not an essential. For such, the Sturgeon centrifuge is immediately useful, and it seems to be only a matter of relatively unimportant mechanical or operational detail to extend the application of the machine to the remainder.

One drawback is common to all three centrifuges, and is not quite so difficult to overcome in the case of the filter press, viz., the limited range of available constructional materials. It will always be more difficult to solve the problems of corrosion in machines with moving parts, such as centrifuges, than with stationary plant like the filter press. Such difficulties, however, are only relative, and when they have been more successfully overcome for the centrifuges than is at present the case, it may well be that the existing and apparently undisputed pre-eminence of the filter press in filtration problems will be very seriously menaced.

It has been impossible in the foregoing to do more than touch the fringe of the intensely interesting questions that will arise during the Conference, and the Group Committee are to be heartily congratulated on getting together such novel contributions. We should have liked to see a short paper on the very important class of vacuum filters, but we cannot urge this as an adverse criticism in view of the limited time at the disposal of the meetings, and the novelty and wide range of the subjects dealt with. We refer those seeking more detailed information of the proceedings to the programme of the Conference, obtainable from the offices of the Group, 24, Buckingham Street, Strand, London, and conclude with our heartiest good wishes for a successful Conference. We hope to make further reference to the meetings in a subsequent issue.

Armstrong College and Newcastle Industries

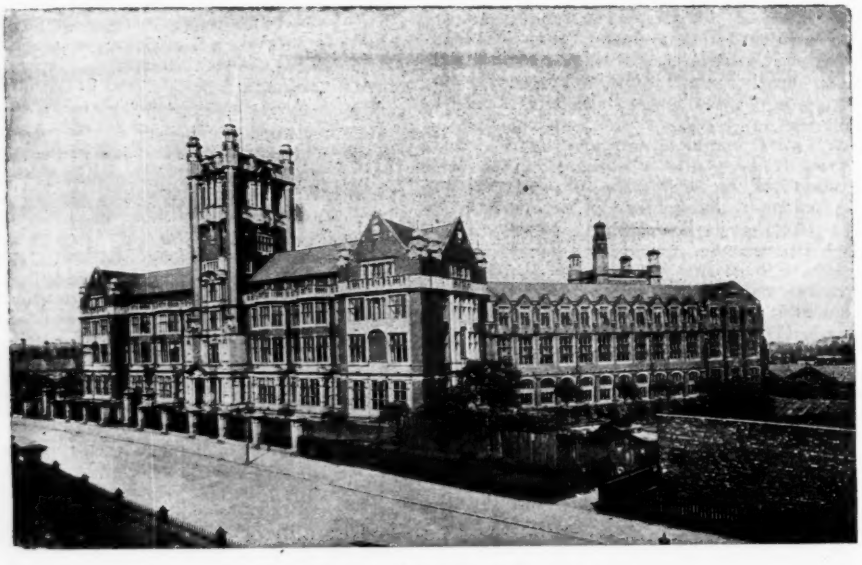
Armstrong College, where the sessions of the Annual Meeting will be held, may fittingly entertain the Society of Chemical Industry, for one of its main purposes has been the application of science to the great industries of the district, and liberal provision has been made in this respect for teaching in chemistry and metallurgy.

The courses of study in Armstrong College provide opportunities for those who wish to qualify themselves for the profession of chemistry, and at the same time obtain a degree in science of the University of Durham. The Degrees of Bachelor, Master and Doctor of Science are conferred by the University, and the Honours Degree in Chemistry is recognised by the Institute of Chemistry as an avenue to admission to the Associateship of the Institute. There are already a number of graduates occupying important and responsible positions in the chemical industries of the district.

Further, with the object of assisting those already engaged in industry, the College has associated itself with the local

section of the Society of Chemical Industry in arranging special courses of lectures by well-known specialists on various branches of applied chemistry. Under this scheme lectures have been given by Professor Desch, Professor Cobb, Dr. Colman and Dr. Mellor. These lecture courses were interrupted by the War, but it is anticipated that they will be resumed this winter.

Much of the research work done in the chemistry department has had its origin in the solution of problems raised by difficulties arising in connection with the industries of the district. Notably has this been the case with the coal-mining industry. The *Transactions* of the North of England Institute of Mining and Mechanical Engineers and the *Proceedings* of the local section of the Society of Chemical Industry contain records of communications dealing with the "gases enclosed in coal dusts," the "inflammability of mixtures of coal dust and air," "the solvent action of pyridine and coal," &c., which from time to time have been contributed by the staff and students. The investigations of Dr. Garrett on the distribution of mineral matter in coal, and the examination of coal by X-rays, should also be mentioned. Again, Dr. Smythe has made contributions to the solution of the problem of the proximate constituents of coal and of a number of geo-chemical problems connected with coal. Further, the agricultural industry has been greatly benefited by the researches of Mr. S. Hoare Collins, M.Sc., lecturer in agricultural chemistry, who either alone, or in collaboration with his students, has published a number of researches bearing on agricultural problems, *e.g.*, cyanogenetic glucosides, sugar in swedes, &c. P. P. B.



Armstrong College, Newcastle.

Review of Society's Annual Reports

Annual Reports of the Society of Chemical Industry. 1919. Vol. IV. Pp. 632. 5s. 6d. to members.

From the standpoint both of bulk and of utility, the Annual Reports volume continues to progress. The latest volume—the fourth of the series—contains almost twice the number of pages contained in the first edition, and it may now be said to cover practically every distinct branch of applied chemistry. When first published in 1916 fifteen different sections were given; in 1918 the number had risen to twenty-two, and it has now reached a total of twenty-eight. As compared with the previous year, the new sections introduced are Explosives and Analytical Chemistry, while the reports on Ceramics, Building Materials and Fermentation Industries, held over from 1918, are included, together with the reports on these subjects for 1919.

The Explosives section, by William Rintoul, forms a valuable abstract of the literature which appeared and the work which was carried out during the whole period of the war. The subject is one to which prominence could not be given during actual hostilities, for so much then depended upon individual progress and the ability to keep such progress secret. In times of peace the veil may be lifted, although there are certain specific facts which must always remain the property of the State alone. When the next volume of Annual Reports is issued it is to be trusted that the Explosives section will be retained, for, although the current progress to be chronicled may not be very considerable, there should be plenty of room for the inclusion of material—particularly that relating to foreign countries—which has necessarily been omitted from the present volume. In view of a recent series of articles in The Chemical Age, it is interesting to note that the adoption of liquid air explosives in Upper Silesia has become so general that a return to the better-known civil explosives is not expected for some time. Meanwhile, two Swedish concerns are erecting seven plants for the production of liquid air for use in mines.

Probably one of the most useful sections to the chemical engineer is that dealing with Plant and Machinery, the report on which has been written by Dr. W. B. Davidson, who, as will be remembered, resigned his position with British Dyes about a year ago in order to take up private practice. Dr. Davidson is the inventor of several pieces of plant, and is well qualified to deal with the subject. He draws attention to the fact that several firms who provided chemicals during the war have suffered from the period of stagnation which followed the Armistice, and that makers of chemical plant complained throughout last year of the tremendous slump in trade. It is to be expected by now, however, that the majority of manufacturers are not disturbed so much by the lack of work as by the fact that it is almost impossible to fulfil orders owing to the difficulty of obtaining material. At present, those in charge of works are not really in a position to consider the wholesale erection of new plant or the question of large extensions, for proper attention to wear and tear during the war period was an impossibility, so that the demand for spares and renewal of existing plant must continue to claim the chief share of attention for some time to come.

Dr. J. T. Dunn is again responsible for the Fuel section, and he draws attention to the fact that very little in the nature of new discoveries has been arrived at. A great deal, however, is expected from colloidal mixtures, particularly when such mixtures are passed through an ordinary fuel oil burner. There still appears to be some doubt as to whether the effect

of the "fixateur" is really permanent, for difficulty seems to have been experienced with the solid separating out from the liquid by gravitation during storage. It is claimed by the Submarine Defence Association of New York that a successful fixing agent has been found, but for the moment the nature of it is to remain undisclosed. One of the great merits of the colloidal principle lies in the fact that a use is found for low-grade fuels which would otherwise find no application.

It is not often that repetition or overlapping occurs in the reports, but it is noticed that Mr. E. V. Evans, in his Destructive Distillation section, quotes precisely the same work as that referred to by Dr. Dunn. This relates to the research of Coward, Carpenter and Payman on the limits of inflammability of gaseous mixtures, and, in a second instance, to the work of Payman and Wheeler on Flame Propagation. Correctly, these subjects would appear to belong to the Fuel section. Similar overlapping is to be found in the sections on Fuel and Mineral Oils, where both writers deal with the Hardstoft developments.

As regards dyestuffs, Mr. F. M. Rowe draws attention to the real progress which has been made; but he deplores the occasional outbursts of destructive criticism, and speaks of the fact that attention has mainly been confined to the commoner and cheaper dyes, which can generally be manufactured quickly and in considerable bulk. It is to be noted that British Dyes, Ltd., as newly constituted, employs about 300 chemists and 6,000 hands.

In a comparatively brief review it is impossible to deal with every one of the sections, particularly as, without exception, they are excellent. Some reports, however, stand out from the others, and one is particularly struck with the progress made in the comparatively new science of refractories. This section is again in the hands of Mr. W. J. Rees, who has also undertaken the new report on Ceramics, which was formerly merged with Refractories. The policy of allotting both sections to one writer is, perhaps, not the most commendable, and one would like to see Dr. Mellor made use of as a contributor. In fact, when the Reports were first published it was understood that their independence would be preserved by the allocation of each separate subject to a different authority each year. The policy is an excellent one, and it is to be regretted that it has not been more generally enforced. For instance, the following contributors in the volume under review were all responsible for the same subjects in the previous year: Dr. J. T. Dunn (Fuel), S. H. Higgins (Bleaching, &c.), W. J. Rees (Glass and Refractories), D. F. Twiss (Indiarubber), F. C. Thompson (Leather and Glue), E. J. Russell (Agricultural Chemistry), J. P. Ogilvie (Sugars and Starches), and H. W. Bywaters (Foods). The Society, however, may have decided originally on a policy which they find difficult to carry out, for in some of the subjects noted above there can be little choice of writers, and it is certainly better to adhere to one authority and maintain the excellent standard set up rather than possibly to lower the standard for the sake of variety. M. A.

Programme of Arrangements

Tuesday, July 13

10 a.m. Council Meeting, Armstrong College.

11 a.m. Annual General Meeting, Armstrong College.
Welcome by the Lord Mayor (Mr. Walter Lee) and the Principal of Armstrong College (Sir Theodore Morison).

1 p.m. Luncheon in the King's Hall, Armstrong College, by invitation of the Newcastle Section.

2.30 p.m. Congress, Chemical Lecture Theatre, Armstrong College: Papers on "By-Product Coking":—
"The coke oven," W. A. Ward;
"Corrosion of coke oven walls," W. J. Rees;
"The Recovery of by-products," E. W. Smith, D.Sc.;
"The more economical utilisation of coke oven and blast furnace gases for heating and power," G. W. Hewson, A.I.Mech.E., and S. H. Fowles, A.M.I.Mech. E., A.I.E.E.;
"Coke oven gas for towns' supply," H. E. Wright.

2.30 p.m. Chemical Engineering Group. Conference on "Filtration" in the Physical Lecture Theatre (chairman, Professor Henry Louis):—
"The principles of technical filtration," E. Hatschek, A.M.I.Mech.E.;
"The Sturgeon automatic self-discharging centrifuge for separating solids from liquids," R. A. Sturgeon, A.M.Inst.C.E.
"The filtration of colloids," W. R. Ormandy, D.Sc.;
"The Sharples super-centrifuge," S. H. Menzies.

8 p.m. Civic reception by the Lord Mayor at the Laing Art Gallery, New Bridge Street, Newcastle.

Wednesday, July 14

10 a.m. Congress, Chemical Lecture Theatre.
"Some properties of 60-40 brass," C. H. Desch, D.Sc.
"Catalytic chemical reactions and the law of mass action," E. F. Armstrong, D.Sc., F.R.S.
"Recent developments of the electric furnace in Great Britain," D. F. Campbell.
"Chemical sheet lead," D. W. Jones.

10 a.m. Conference of Chemical Engineering Group, Gaiety Cinematograph Theatre, Nelson Street (chairman, M. Paul Kestner):—
"A new process for centrifugal filtration," W. J. Gee.
"Recessed plate and plate-and-frame types of filter press," E. A. Alliott, B.Sc. (Eng.), A.M.I.Mech.E.
"The design of mechanical filters," Balfour Bramwell.
"Notes on filtration of air and other gases," J. M. Brown.

1.30 p.m. Chemical Engineering Group luncheon, County Hotel, Neville Street.

2 p.m. Society of Chemical Industry: Visits to Works:—
The Tharsis Copper & Sulphur Co., Ltd., Hebburn;
Palmers' Iron & Shipbuilding Co., Ltd., Jarrow;
Swan, Hunter & Wigham Richardson, Ltd., Wallsend.

3 p.m. Chemical Engineering Group, visit to the works of the International Paint & Compositions Co., Ltd., Felling-on-Tyne.

7.30 p.m. Annual dinner, King's Hall, Armstrong College.

Thursday, July 15

Visits to Works:—
Whole day. Ashington Colliery, luncheon at Ashington by invitation of the Ashington Coal Co., Ltd.

or

Whole day. (*a*) John Bowes & Partners, Ltd., By-Product Coking Works, luncheon at Marley Hill by invitation of the firm;
(*b*) The Newcastle Alloy Co., Ltd., tea at Rowlands Gill by invitation of the Company.

Morning. Newcastle Breweries, Ltd., Haymarket, Newcastle.

Afternoon. Cookson & Co., Ltd., White Lead and Lead Oxide Department, Hayhole Works, Percy Main.

8 p.m. Conversazione, King's Hall, Armstrong College, by invitation of the Newcastle Section. Music. Dancing.

Friday, July 16

Whole Day Excursion. Motor ride, up the Derwent Valley, across the Moors to Blanchland, thence to the Tyne Valley and the Roman Station at the Chesters, returning along the Roman Wall. Luncheon and tea en route.

During the week of the meetings, and until July 24, an exhibition of chemical products, &c., of the district will be held in the Armstrong College Buildings.

Manchester College of Technology

AFTER a long discussion the Manchester City Council on Wednesday confirmed the Education Committee's new policy with regard to the College of Technology, which has been the subject of keen controversy during the past few weeks. As we recently stated, the authorities propose to limit the number of university degree and certificate students to be admitted for the year 1920-21 to 80, and suggest that any further admissions required to make up this number should be made from Manchester applicants. Urgent speeches were made to induce the Council to refer the report and recommendations back to the Education Committee, but the line taken by the Education Committee was approved by a decisive vote. The policy of the Committee was attacked on the ground that an institution like the College of Technology, with its magnificent equipment and its staff of specialists, would be wasted if devoted to the teaching of pupils at the elementary stages of their study. The most economical use of its resources, it was urged, could only be made if it catered mainly for degree students, and strong emphasis was laid on the need in the industries of the Manchester district for degree men trained in the methods of research.

A New Alloy

THE discovery of a new alloy with important industrial possibilities is announced by the Paris Academy of Sciences. It is to be called Elinvar, and it has been made by Guillaume, inventor of Invar, an alloy, which is extensively used by makers of scientific instruments in France. The new alloy, it is claimed, is an improvement on Invar, and is peculiarly valuable, by reason of its uniform elasticity for more delicate parts of watches. Guillaume was led to discover it in his search for an ideal spiral compensation which would work under any temperature.

Training and Functions of the Chemical Engineer

Points for consideration at Newcastle

The following article by a well-known authority in chemical industry is timely, and should provide a popular theme for discussion at the forthcoming meeting at Newcastle. Possibly, some of our readers may find themselves in disagreement with the writer's reasoning, in which case we shall be pleased to publish their views.

At the Annual Meeting of the Society of Chemical Industry on July 14, members of the Chemical Engineering Group of the Society will meet at a Conference to listen to and discuss papers on "Filtration." Although a very full programme has been arranged for the four days of the meeting, the members will be resident in parties in the Newcastle hotels, and, without doubt, opportunity will occur to discuss informally other matters of general interest. If some scribe amongst them will make notes, valuable expressions of opinion upon the training and functions of a chemical engineer should be available for the further consideration of the Group Committee.

The literature concerning this subject is extensive, but no conclusive verdict upon many fundamental matters relating to the subject has yet been obtained. In view of the rapid development of the departments of chemical engineering at the Royal College of Science, London, at the Universities of Birmingham, Edinburgh, Glasgow and Manchester, together with the increasing number of evening classes at technical institutes such as the Battersea and Northern Polytechnics, we should at least by now have decided upon the training foundations if proper progress is to be made. The Chemical Engineering Group is the only body in this country definitely set up to consider amongst other matters chemical engineering training, and as its Committee represents every class of man between the "almost pure" chemist and the "almost pure engineer," it is well qualified to issue a definite opinion upon a subject which formed an important "plank" in its platform. Such opinion, however, should be expressed after mature consideration by a full committee, the points of view raised in the Faraday Society's discussion in 1917, the later statements by Lord Moulton and Professor Donnan at the opening of the new University College laboratories,* and by speakers at some of the meetings of the Group being carefully re-read.

Misplaced Energy

One is constrained to ask for this lead after reading in a contemporary journal the recent article by a member of the Committee, whose views differ in many essential points from the views of the Secretary of the Group, so well expressed in an informal manner and so well supported by the May gathering at the Chemical Industry Club.

It is unfortunate that in many recent movements in this country, where the call has been for a constructive programme, much energy has been wasted in party and personal strife, and the interests of the community or industry have for the time being received but minute attention. In the chemical engineering movement, instead of a fight for principles, we have a contest for a coupon, and we seem to forget that the need is for a type of man required to improve the chances of salvation of the industry, and not for a man on whom a title can be bestowed by a dialectical purist. No one type of man can be regarded as the essential man in the industry—the technical and commercial director, the chemist, the chemical engineer, the engineer, the accountant, and even the storekeeper, each fulfil an important function in the works organisation, and the most successful works will be that in which the staff works as a team pulling together, and not according to the individual inclination of each unit. Almost every class of worker can be made to execute a useful function under the guidance of an experienced superintendent of a large chemical works; the ex-sea-going engineer with his controlling idea that plant must be kept running, and his sound habits of discipline, has, in many cases, proved an excellent maintenance engineer. The old contest between sections must be dropped at once,—co-operation is sought, and not class jealousy. If writers from the engineering side throw ink at the chemist, the chemist can readily retaliate by quoting instance upon instance where an engineer responsible for chemical work has ruined process and plant beyond redemption, and has failed not only to consider the chemical aspects of the matter, but occasionally has neglected elementary engineering principles.

* The Chemical Age, March 13 and 20, 1920.

The Chemical Engineering Group begins with the right point of view. It desires that the whole industry should flourish and that personal animosities and jealousies should be buried. It welcomes as members chemists and engineers, and knows that by bringing these two professions together both will carry out their duties in laboratory, works or office, with better understanding and with greater efficiency. In addition, it has the chemical engineer member who is considered by the Hon. Secretary to the Group to be "one who designs, erects and directs the working of chemical plant for carrying out chemical reactions on a commercial scale, chemical engineering being considered to be a science to be taught and a profession to be practised."

This definition may now be examined in the light of statements by various authorities.

The Scope of a Chemical Engineer

Dr. Ralph McKee, Professor of Chemical Engineering in Columbia University, defines the scope of a chemical engineer's work by stating that "he applies knowledge obtained from the field of pure science and from the field of engineering to the solution of problems in applied chemistry, due consideration being given to the financial factor so that the solution is commercially practical." Chemical engineering training in the infancy of the movement in the States was largely a university course conceived primarily along engineering lines. During the past fifteen years a gradual change over has been made, the emphasis now being placed on the chemical training. The time devoted to chemical and physical laboratory work has been increased, the course in civil engineering has been eliminated, courses in mechanical drawing and shop practice reduced, while heavier courses in physics, study of business law, contracts and costs have been added. A short course in biology bearing particularly upon the utilisation of bacteria, yeasts, &c., is given. Phases of the work include Chemical Factory Machinery, Applied Colloid Chemistry, Factory Wastes Disposal, Plant and Labour Management, Danger Regulations and Efficiency Engineering.

Reference to the *Transactions* of the Faraday Society shows that while some of the speakers at the meeting called to consider the question of training and work of the chemical engineer fought shy of the term "Chemical Engineer," no shadow of doubt existed as to the main object in view, or, in general terms, the lines to be pursued in attaining that object.

Sir George Beilby stated that the successful engineer does not, as a rule, take the standpoint of the chemist seriously, and that only very rarely does the engineer get so far into the circle of chemistry that he can himself look at chemical problems from the chemist's point of view. On the other hand, he had found that it is not so unusual for a trained chemist who had some natural aptitude in mechanical matters to acquire the engineer's point of view. Sir George Beilby went on to say that this fact justified the inclusion of as much engineering as possible in the training of chemists for industry, and that from the students who have acquired in this way both points of view will be recruited the true chemical engineers,—men who can translate processes from laboratory apparatus to that of the factory. The chemist's views of matter and energy are much further removed from everyday notions and conceptions than are those of the engineer, and it is wiser first to imbue the mind of the student thoroughly with the more difficult, because less ordinary, point of view.

Principles of Training

Professor Hinchley at the same meeting developed the argument not only for co-operation between engineers and chemists, but also for the training of chemical engineers, his initial material being preferably a well-trained chemist.

Professor Coker suggested that the whole training should be grouped round the chemical engineering laboratory, but that where the student had commenced in the engineering faculty, he should proceed to the chemical section for a sound training in general chemistry.

The late Professor O'Shea sought not the chemist with a little knowledge of engineering or the engineer with a smattering of chemistry, but a scientifically trained man with a sound knowledge of that branch of engineering applicable to chemical industries. The scientific training was to be used as a foundation for the applied training which was to follow rather than run concurrently with it. He advocated that the chemical engineer should first receive a scientific training independent of the workshop, and subsequently an engineering training when his scientific training, of which chemistry forms the primary and outstanding subject, had reached the necessary standard.

Throughout the discussion one point remained clear—that a fresh type of man is required in British chemical industry for its maintenance, development, and improvement, and that a sound general knowledge of chemistry and physics was one of the most important requirements. "Control" and "develop" were words repeatedly used.

Reading more recent opinions, we find Professor Donnan stating that the new University College laboratories are intended to act as a connecting link between the chemical and engineering departments in training the future scientific controllers of the industry.

The views of Lord Moulton,* delivered in an address "The Training and Functions of a Chemical Engineer," have been so recently before the reader that there is no need to quote them fully. Suffice it to repeat some of the points on training. "First of all the chemical engineer must have a knowledge of chemistry, for, after all, it was chemistry which inspired him. He wanted above all a sound knowledge of the chemistry that made him realise the nature of the actions which went on in the more simple processes. He could easily make himself acquainted with any special task that he took up, but what he must get was the realisation of the best of chemistry—above all, the developments of the last half-century in physical chemistry. The chemical engineer had to learn to do accurate costing and to achieve results on the large scale with a laboratory standard of excellence without laboratory aids."

Against these views a member of the staff of the Royal College of Science develops another, the older, line of argument. In the first place he makes the fatal mistake of assuming that once a chemical process is running smoothly, there is no real chemical work involved in carrying it on. Pure chemists, too, have fallen into the same error, and hence the main factor in the cost of most chemical products, the cost of raw materials, averaging as it does 65 to 85 per cent. of the total expenditure of the factory, receives little scientific attention. A chemical process is running smoothly from the engineer's point of view not when it is running efficiently, but when he is not further worried by it.

The works chemist, or "production man" to give him his new title, will read the following quotation from this writer with more than interest. "Once the methods of routine testing of re-agents and products at various stages have been worked out and systematised, a chemical student straight from college could carry them out, and how any chemist who is a real chemist can wish to have anything more to do with the plant when there is research work—real chemical work—waiting to be done is a mystery, except that many chemists seem to prefer any sort of work almost to chemical work."

One might consider the "Costs and Efficiencies of H.M. Factories" Report in this connection. H.M. Factory, Queensferry, was built after many months manufacturing experience at Oldbury was available, but yet during the first two years of its work, works chemists and engineers in co-operation effected enormous improvements in efficiencies, with resulting reductions in costs of output. Again, the process of a Nottinghamshire factory was restudied by works chemists with a sound knowledge of physical chemistry, and entirely remodelled with brilliant results, the raw materials, labour, and plant maintenance charges all being reduced.

This writer insists that chemical engineering is a branch of engineering, and that the chemical engineer must be an engineer first, last and for all time, his original training being that of an engineer, including the serving of an apprenticeship in the shops, "as in the case of any other true engineer." To this is added a real aptitude for and knowledge of chemistry, physics and physical chemistry. From the rest of the article one might gather that the chemical engineer is simply an experienced chemical works draughtsman. Finally, one learns that the works chemist or engineer may take a course of chemical engineering by postal instruction—what an opportunity for Heath Robinson to give us a pictorial view of the chemist studying the subject with the home aids of a water-tap, bicycle pump, kettle, and special Meccano set. The whole point of view marks an important change of attitude at South Kensington.

The Institute of Chemistry now holds an examination for the Fellowship in the branch of chemical engineering, this examination following the Associateship examination in general chemistry. The Institute was granted a Royal Charter with definite authority to examine, to grant certificates of competency, and to register persons qualified to practise, and it must be assumed that the Technology and Examinations Boards of this body carefully considered the various aspects of the matter before instituting this branch examination.

Endeavouring to balance the evidence, the conclusion is that chemical engineering is a definite science to be studied by engineers or chemists, chemistry being a foundation subject and common sense an important requirement.

* The Chemical Age, March 20, 1920.

Nitrate Sales

It was stated on Monday that the Producers' Association had made further sales during the previous few days totalling about 60,000 tons at 17s. 3d. per quintal. A further sale of 50,000 tons is announced, making a total since June 14 of about 1,145,000 tons. In their latest circular Thomson Aikman, jun., state that the market has been firm, and business in cargoes reported at 22s. for near arrival and at 24s. 6d. per cwt., c.i.f., for October-November shipment. The feature has been the large sales by the Producers' Association since the new scale of prices was fixed on June 23. The sales advised have been 57,000 tons July at 15s. 6d., 85,000 tons August at 15s. 11d., 8,000 tons November at 17s. 1d., 120,000 tons December-March at 17s. 3d., and 15,000 tons April at 17s. per quintal. It is understood, the circular states, that, in view of the increasing scarcity of fuel on the West Coast, no further sales are likely to be made for the present. Intermittent strikes continue all along the coast, and shipments are, in consequence, being seriously delayed. The shipment figures for June are cabled as follows:—To Europe, 40,000 tons, against 4,000 tons in 1919; to the United States, 51,000 tons, against 19,000 tons; to Japan and other countries, 15,000 tons, against 13,000 tons. Loading at July 1, for Europe, amounted to 50,000 tons, against 15,000 tons; and for the United States, &c., 10,000 tons against nil. Freights continue dull, with several fixtures of July-September steamers reported at 100s. per ton, and liner parcels direct to the United Kingdom at about 70s. per ton.

Margarine Workers' Strike

Owing to a dispute with the unskilled workers, Van Den Berghs, Ltd., closed their margarine works at Townsmead Road, Fulham, on Monday. Of a total staff of 1,500 men and women, 1,200 workers struck for an extra £1 a week. The following statement has been issued from the head office of Van Den Berghs: "A strike has broken out in Van Den Bergh's margarine factory at Fulham for higher wages. This strike, in the opinion of the management, is entirely unwarranted. In the first place, it is a fact that the wages at the margarine factory are higher than at any other factory in the district. The work is not exacting, and is well remunerated. The management, moreover, has been anxious to promote the welfare of the employees in every way. Some time ago they purchased a large tract of land in the neighbourhood, which has since been laid out as a sports ground. On the factory premises there are separate canteens for male and female workers, where food can be purchased at lowest prices, and in the girls' rest room there is a grand piano for use of the women workers when off duty. Furthermore, there is a trained nurse on the permanent staff to look after the welfare of the employees. The management are satisfied that their employees have no legitimate grievances, and that in the present circumstances the granting of the union's claims would be disastrous to the factory. They have, therefore, firmly decided not to accede to these claims, and they have no doubt that reason will soon prevail with the majority of the employees."

Cellulose Acetate

Some of Its Industrial Applications

IN a recent issue of *Chimie & Industrie* (May, 1920, 3, pp. 591-607), M. Deschiens discusses the chemical constitution of cellulose acetate, its properties, manufacture and uses. Cellulose acetate now forms the basis of a great and growing industry, and the stimulus given by the war is being more than maintained under peace conditions. Among its more important industrial applications is the manufacture of artificial silk and cinematograph films, and in both these directions there is very large scope.

The three best known acetylated derivatives of cellulose are the mono-, di- and tri-acetates, but from the industrial point of view the tri-acetate is the most important, although it is not easy to prepare in a perfectly pure state, and is generally mixed with the lower acetates, especially di-acetate, and also with the products of hydrolysis and decomposition. A rather complex product may, therefore, result, so much so that acetate made by the same firm and by the same method is not always exactly the same: at all events, in physical properties, such as viscosity and solubility, although chemically they may be very similar, and, indeed, indistinguishable by analysis. Those acetates which contain the highest percentage of free acetic acid, ash, and matter insoluble in acetone are the least heat resistant, and decompose at the comparatively low temperature of 176 deg., whilst a sample from the well-known works "Usines du Rhone" began to decompose at 218 deg., decomposition being complete at 224 deg.; its viscosity at 15 deg. was 16·5, acetone insoluble matter at 15 deg. was 0·2 per cent., free acetic acid 0·005 per cent., ash 0·18 per cent., and aceto-cellulose content 43·08. This sample was exceptionally resistant to heat. As a rule commercial samples begin to show signs of decomposition at 175 deg.

Cellulose tri-acetate is obtained by direct acetylation of dry cellulose with acetic acid and anhydride, hydrolysis being accentuated by traces of inorganic acid or compounds supplying that acid—either sulphuric or phosphoric. After discussing the mechanism of the bi-molecular reaction and comparing the acetylation of cellulose with the nitration of cellulose, M. Deschiens states that the most important working conditions are careful choice and rigorous analytical control of material used; adaptation of reagents used to any variation in raw material; uniform and regular acetylation with rigorous control of temperature; close attention to hydrolysis and "ripening," with frequent sampling to test solubility and plasticity, followed by microscopic examination. The best products are those with the greatest solubility, lowest percentage of sulphuric acid and most resistant to heat. The following table gives results of some tests made by the author:

Acetate made by	Moisture.	Ash.	Viscosity.	Free acetic acid.	H_2SO_4	Temp. nascent decompo.
H. Dreyfus, Basle	5·97	0·32	18·9	0·005	0·34	178°
Ditto	3·95	0·45	27·0	0·006	0·53	173°
British Cellulose Company	4·94	0·42	30·6	0·006	0·90	170°
Ditto	5·22	0·41	38·2	0·068	0·24	164°
Usines du Rhone	4·40	0·40	11·3	0·004	0·21	218°
Ditto	4·96	0·16	10·0	0·01	0·12	220°

The presence of sulphuric acid is particularly injurious, especially with a comparatively high percentage of free acetic acid. In order to inhibit the undesirable action of free acid on the acetylated product, Lederer has proposed the addition of a certain amount of carbon tetra-chloride to precipitate the acetate, which is then recovered by filtration, centrifuging and drying, and the acetic acid and anhydride removed by fractional distillation. Compare also Dreyfus's patents abstracted in the *Journal* of the Society of Chemical Industry, Vol. 32, p. 421. The acetic acid used in the acetylation bath and washing liquors may be recovered by neutralisation with barium carbonate, the salt formed being evaporated to dryness and the corresponding acetates used for the direct production of acetic acid and acetone. Magnesium oxide may also be used for neutralising.

Manufacturing Processes

Ordinary unchanged cellulose is most commonly used now, but in some patents taken out by the Badische Anilin & Soda fabrik acetylation of hydro-cellulose or oxy-cellulose is described, and the material may or may not be dissolved in the acetylation bath. In the former case, in which it is dissolved, 100 parts of cotton cellulose, for example, are soaked in acidulated water (4 to 5 per cent. H_2SO_4), and then pressed till the mass contains no more than 20 parts acidulated water. The mass is lessened and placed in a mixture of 400 parts acetic anhydride, with 400 parts acetic acid, the temperature being kept at about 40 deg. After complete solution, the product is precipitated with water, washed and dried. When the non-solution method is used, 100 parts cotton are soaked in dilute (60 per cent.) sulphuric acid, and pressed till the dilute acid represents 10 parts. The hydrolysed cellulose is then treated with 300 parts acetic anhydride and 1,100 parts benzene for 12 hours, the temperature then raised to 60–65 deg. over the water-bath fitted with reflex condenser until a sample tested shows complete solubility in hot chloroform. By this method (*see also* French patent 316,500) it is claimed that the cellulose retains its initial form and texture, but has a comparatively low heat resistance.

In the much more usual method of acetylating the natural cellulose, which is first dried and bleached, acetic anhydride is used in the presence of a catalyst, usually sulphuric acid; but sulphates may be used and occasionally zinc chloride. Here, again, the material may or may not be dissolved in the treatment bath. In the former case, as described and illustrated in Miles's French patent 358,079 of 1905, also No. 494,832 of 10/6/19, the process takes place in five stages: (1) *Acetylation*—100 parts by weight of dried cellulose are mixed with 270 to 310 parts pure acetic anhydride and 390 to 410 parts acetic acid, together with 3 to 5 c.c. of 66 B. H_2SO_4. Mixers of special type are used of 300 to 600 litres capacity. The reaction is exothermic, and the initial temperature 40 deg., afterwards raised to 50–65 deg. over the water-bath until complete solution in cold chloroform is achieved; and (2) *Hydrolysis* then begins, a mixture of 60–65 c.c water with 60 c.c acetic acid per 100 g. of cellulose being gently added and continuously stirred to prevent any precipitation. (3) *Ripening*—The mass is removed to similar mixers of larger size and kept at 40–50 deg. for 12 to 16 hours, wherein hydrolysis is completed and ripening takes place. This latter consists merely in the more complete and finer sub-division of the cellulose acetate molecule, and its increasing solubility in acetone. The ripened product should be insoluble in cold chloroform, plastic in hot chloroform and soluble in acetone; but if the ripening is carried too far an undesirable complex mixture of hydrocellulose acetates is obtained, and ultimately cellobiose. (4) *Precipitation* is effected in cold water containing sufficient alkali to neutralise the sulphuric acid. The white flocculent precipitate is washed and neutralised as quickly and completely as possible. (5) *Drying* takes place in large airy rooms at a temperature of 20–25 deg.

In acetylating without solution carbon tetrachloride, benzene or other non-solvent of aceto-cellulose is added to the bath, as described in U.S.A. patent No. 824,374 of 1907, or French patent No. 450,886 of 1913.

Properties

Ordinary cellulose acetate, which is the tri-acetate mixed to some extent with the di-acetate, is a coarse fibrous powder of specific gravity about 1·2, decomposing at about 210 deg., less inflammable than nitrocellulose, showing blue under polarised light. It is insoluble, but swells very considerably in water, many alcohols, benzene, butyl formiate, &c. It is saponified at ordinary temperature with half-normal potash, and absorbs methylene blue very rapidly, according to the degree of swelling. It is soluble in the cold in many organic solvents, acetaldehyde, the acetals, acetone, formic acid, acetic acid, methyl and ethyl formiates, methyl acetate, aniline, the phenols and cresols and benzylic and oxybenzylic alcohols and many others. It is also soluble in mixtures of substances which, singly, do not dissolve it.

Industrial Uses

Long before recent developments, cellulose acetate had been used for varnishes for balloon fabrics, to make these fabrics more gas-tight. One such varnish, for example, contained

15 parts acetate, 2 parts rubber and 100 parts tetrachlorethane. Mixed with more or less volatile solvents, cellulose acetate is very extensively used for aeroplane dopes. The evaporation of the solvent leaves an elastic skin of varying thickness, which should be homogeneous, transparent, elastic, tenacious and impermeable by water, castor oil, petrol. It should, of course, leave a perfectly smooth surface, to reduce air friction as much as possible. During the war the aviation authorities of the Allies agreed upon a standard dope which gave very good results; it contained 80 parts cellulose acetate with 860–890 parts light solvent and 30 (winter) to 40 (summer) parts of heavy solvent, such as benzylic alcohol or phenol; or it might contain 60 parts furfurol. The tension or stretching of the treated fabric is measured by the aerotensiometer, and it was found that an untreated linen fabric, for example, showed a tension of 13·7 mm., but after the first coat of standard dope this was reduced to 6·0 mm., after the second coat to 4·9 mm., and after the third coat to 4·3 mm. Untreated linen has a tensile strength of about 1,500 kilos per linear metre, and this is increased by 25 to 50 per cent. by the addition of three coats of dope. According to M. Guiche (*Essais d'aerodynamique*, Gauthiers-Villars, 1914), an aeroplane travelling at 250 km. per hour is exposed to a pressure of 180 kilos per square metre, and its safety coefficient is about 45. M. Guiche is at present engaged on experiments to test the diminution of air resistance due to the application of dope.

In the manufacture of celluloid, plastic masses, films, &c., cellulose acetate finds extensive use, as it is less inflammable than nitro-cellulose and has other advantages. It is also largely used in the manufacture of sheeting used in place of glass on motor cars and aeroplanes; for making artificial leather and textiles, artificial silk, &c., phonograph cylinders and for many other purposes.

In a short bibliography appended, M. Deschiens refers to E. C. Worden's "Technology of Cellulose Esters, 1916"; Cross and Bevan's classical researches; and to the following patents: Usines du Rhone's English, 25,893/1911,13,696/1914, 7,773, 8,046, 10,882 of 1915; French, 438,240, 473,399, 477,620 and 478,436; Dreyfus's English patents, 19,330/1905, 26,657/1909, 20,975/6/7/8/9/ of 1911, 20,852, 21,376, 22,645 of 1912; 6,403, 14,101, 17,920, of 1915; and 100,009, 100,180, 101,555, 105,064, 105,065, 108,459, and his numerous French patents.

The Midland Glass Trade

THE Midland glass industry is (our correspondent writes), in certain sections, very busy, but it is still in a state of transition owing to the vast schemes of extension which have not yet become fully effective. Owing to difficulties in getting supplies of raw material, the output of plate glass is inadequate, and supplies from abroad are appreciating very rapidly. The flint glass trade is very brisk, the recent price advance having had no effect apparently on the demand for table wares, decorative designs and lighting glass. In the home trade inquiry continues good, but the export business is exceptionally large. A fair output is being obtained in chemical glass, &c., but supplies of this and other grades are being received from Germany, and the quality standard is not what it was formerly. A limited amount of mirror glass is arriving from France and Belgium. The prospects of the British glass industry are better than for many years past.

Nauru Island Phosphate Deposits

WHEN the Island of Nauru Agreement Bill came before the Standing Committee of the House of Commons on Tuesday, Lord Robert Cecil secured the addition of a League Covenant amendment to the Bill in spite of Ministerial opposition. The Bill, as already explained, confirms an agreement between the British, Australian and New Zealand Governments for the purchase and working of the phosphate deposits—said to be the largest in the world—in this small island in the Pacific. Opposition to the measure was offered from the League point of view when the measure was up for second reading, but a motion for its rejection was then defeated by 217 to 77. The Bill contains one clause and schedule. There was only one amendment on the paper, and that was in the name of Lord Robert Cecil, adding the words in clause 1, "subject to the provision of article 22 of the Covenant of the League of Nations." A long discussion followed, and a division resulted in the amendment being carried by a majority of one.

Chemical and Dyestuffs Traders

Strong Protest Against Excess Profits Tax

AN important memorandum on the subject of the Excess Profits Duty has been addressed to the Chancellor of the Exchequer by the Chemical and Dyestuffs Traders' Association. In the course of the document, Mr. Fred. T. T. Reynolds, vice-president and chairman of the executive council of the Association, states:—

"On behalf of the Executive Council of the Chemical and Dyestuff Traders' Association, we are directed to make a strong protest against the continuance and proposed increase in the rate of the Excess Profits Tax. Our Association represents an important section of traders engaged in importing, exporting and distributing commodities vital to the industries of the United Kingdom, and is in a favourable position for gauging some of the effects produced by the tax continuing, notwithstanding the definite assurance given by yourself and your predecessors in the office of Chancellor of the Exchequer that it would cease with the war or with the last financial year.

"We respectfully submit that, whilst in some cases justifying its name and the principle upon which it was based, this tax in practice penalises enterprise, perpetuates high prices, discourages maximum production, encourages extravagance, places British traders at a serious disadvantage in competition with foreign traders, who are not subjected to such a serious handicap, and acts as a severe restraint on trade and upon supplies just at a time when it is greatly in the national interest to promote increased trade and to ensure plentiful supplies.

"During the course of the war extreme taxation was willingly borne, but under present conditions we are of opinion that it is unfair, inequitable and indefensible that so great and undue a proportion of taxation should be placed upon one section of the community, especially when a large part of that section consists of the most energetic and enterprising traders.

"We would point out that the Excess Profit Tax, with the high Income Tax and the Company Tax, would leave the real nett earnings of many firms much lower than they were before the war, and that this would inevitably prevent extension or expansion.

"With all due deference, it is submitted that if the estimates for national expenditure during the current year are reduced to more reasonable dimensions it might then be possible so to amend the proposed Excess Profits Duty that (*a*) the rate would not be increased from 40 per cent. to 60 per cent.; (*b*) special consideration could be given to firms and companies with a low pre-war standard, with a view to making such standard synchronise with the present relative value of money; (*c*) that similar consideration could be given with regard to the salaries paid to managing partners or managing directors."

Association's New Offices

The Association has made arrangements for opening London offices at 22, Buckingham Gate, S.W.1, to which address correspondence may now be addressed. The joint secretaries hope to be in attendance from next week to deal with the Association's business, and to answer inquiries. Mr. Reynolds, accompanied by the secretaries, attended at the Board of Trade last week, and in the course of an interview explained the work and objects of the Association and its relation to the Department. The result of the interview was regarded as entirely satisfactory.

Anglo-German Debts

THE Controller of the British Clearing Office is advised that claims may not have been registered in respect of debts secured by liens or charges in favour of British creditors on securities belonging to German nationals which have been sold or otherwise disposed of by the Custodian of Enemy Property in pursuance of the Trading with the Enemy Acts and the Treaty of Peace Order, 1919, and notifies persons who may claim to be creditors against German nationals, that they should prove their claim through the Clearing Office before July 12, 1920, notwithstanding the fact that they hold, or believe that they hold, security in respect of such claims. If creditors coming within this category fail to prove their claims by the date above mentioned, it will be at their own risk. Enquiries should be addressed to the Secretary of the Clearing Office, Cornwall House, London, S.E. 1.

Industrial Research

Recent Extensions in the United States

In the American edition of *The Times*, which was published last Saturday, Mr. Harrison E. Howe, of the United States National Research Council, contributes an article on the research work which is being carried out in connection with the American industries.

"In a number of cases," Mr. Howe states, "the research staff brought together by industrial concerns for the solution of war problems has not been greatly reduced, as it is recognised that many production problems of peace are similar to those of war, the emphasis alone being in a different direction. One of the great chemical companies has steadily increased its force of scientific workers, until to-day approximately 1,200 are in its employ engaged in research and control work. Not so long ago it was considered easier to place a good average analyst than to find a concern willing to make the necessary investment in a thoroughly trained research man. That has greatly changed, and the call at the moment is for the highly trained specialist, with as much experience in industry as possible, although a first-rate analyst still has his own field.

Advertising Research Work

"Another encouraging sign is the emphasis being placed by manufacturers upon their research departments in their popular advertising, the public in this way being educated to appreciate the different commodities produced under scientific control and improved through industrial research and those which depend upon chance discoveries and empirical processes for their creation. Again, lately, concerns have been more willing to state in round numbers the cost of their research departments and the earning capacity which this expenditure has achieved. And there has been a willingness to co-operate in fundamental research to a degree that has not been possible heretofore. A few association laboratories have been established in the United States, and these have prospered, fully justifying the experiment. At present an effort is being made among several groups to have them pool their resources for the pursuit of that type of research which can be conducted without competition among the members, leaving to the members the work of applying the result achieved to their own industries in their own way through their scientific departments.

"A new agency has entered the field for the purpose of further stimulating such research and is assisting in the training of men qualified to conduct it and to apply its results. This is the National Research Council, a body formed with the co-operation of national, technical and scientific societies and operating as a committee of the National Academy of Sciences, and not as a Government bureau or department. Its efforts are directed in many fields of natural science, to increase the number of trained men as well as the amount of knowledge at the disposal of industry, and it is administering the National Research Fellowships in physics and Chemistry, spending $500,000 (£100,000) in five years upon young men of promise. The research worker to whom a fellowship is granted chooses his own subject and the place where his work is to be conducted, subject, of course, to suitable restrictions. The Council is als acting on behalf of the chemists and physicists in organising and securing support for the compilation of critical tables of physical and chemical constants now so needed in industrial research."

Special Researches in Progress

Mr. Howe then outlines the special researches in progress at present in the various industries.

Solvent recovery is being practised on a large scale, following the development of new methods, which, among others, involved the important part of immersing the pumps used in an oil or other bath, so that temperatures could be controlled and the premature condensation of the recovered solvent thus avoided. In one of the rubber products factories the solvent recovered at the present time runs, it is stated, into thousands of gallons daily, and has a direct economic bearing.

"Closely related to this work," Mr. Howe states, "is the new art of japanning without the use of volatile solvents, thereby not only producing improved results, but avoiding danger of fire. In this connection colloidal chemistry plays an important part, the japanning material being suspended in an emulsion which facilitates ease of application and gives uniformly coated work. Intense interest in colloidal chemistry and its possibilities has been aroused throughout the country, success in perfecting a colloidal fuel being one important achievement. There is reason to believe that such fuel will make it possible to utilise many waste materials, such as sawdust, culm, &c., to great advantage, at the same time materially postponing the time when fuel oil will be a scarce commodity. Another important piece of fuel research has had to do with the application of the principles of ore flotation to high ash coals, from which by far the greatest percentage of ash can be removed in this simple fashion. The oil used in the process can be recovered for re-use, or, when economically advantageous, allowed to remain with the purified coal.

Petrol Substitutes

"Some progress has been made on the problem of supplying a fuel for internal combustion motors which will be as efficient as gasoline. Fuel composed of ethyl alcohol, benzol and kerosene, together with a small percentage of a blending agent, has appeared, and the trials indicate its ultimate success. The extensive use of such fuel, however, depends upon very much cheaper sources of ethyl alcohol, and this phase of the study has likewise received continual attention during the last year or two. The result has been the possibility of increasing quite materially the yield of this alcohol from waste wood, such as sawdust hydrolysed with acid to produce fermentable carbohydrates. This material is then fermented and the alcohol distilled in the usual manner.

"The petroleum interests have also been particularly active, and, largely through the efforts of Dr. Manning, lately director of the Bureau of Mines, the American Petroleum Institute has been initiated, and will shortly begin its researches. On this programme the possibility of increasing the yield of motor fuel from crude petroleum occupies a conspicuous place. Research has continued to improve the several cracking processes, which also seek to produce increasing percentages of motor fuel from crude oil.

Carbon Black

"Associated with the petroleum and natural gas industries is the manufacture of carbon black, recognised as an essential in a variety of industries. Some important research has lately been done upon this substance, the chief purpose of which being to ascertain why it is so well suited to certain uses where lampblack is not satisfactory. As a result of this work, it is confidently expected that, using some of the information gained in the production of activated charcoal for military purposes, ways will be found for keeping up the supply of carbon black from sources other than petroleum and natural gas. These materials will continue to become less plentiful, hence the importance of finding another source for carbon black.

"Oil may be mentioned in other connections, for substantial progress has been made in ore flotation, more particularly in determining the various kinds of oil that may be successfully used and the particular oils necessary for the separation of certain ores from the gangue. Ore flotation is being practised on a very large scale in the United States at the present time, and research may be expected to extend the application of these principles.

"For a considerable time most of the oil seed crushing has been done without due regard to all the scientific factors involved. The larger companies are turning to research, and the smaller ones are considering the association plan for making similar benefits available for themselves. The employment of vacuum extractors is making it possible to remove the objectionable odour of the solvent from the seed meal, so that the last of the oil may now be recovered without detriment to the important by-product—the press cake. At least one of the great companies has found ways to increase the average yield of oil per ton of seed, and to avoid refining losses, so that a larger percentage of the crude oil is recovered as refined than has heretofore been the practice.

"The work upon carbon conducted on behalf of the Chemical Warfare Service has attracted attention to the problem of developing improved decolorising charcoals, and within the year several of these charcoals have made their appearance. It is claimed that they are even more efficient than the material formerly imported, and without doubt the possibilities have not yet been fully realised."

Dyes and Drugs

At the Bureau of Chemistry work has been done on furfural, which indicates it as a starting point for a series of dyes comparable in importance to some of the aniline series, and research has further shown that furfural can be made quite cheaply from such cellulose materials as corncobs. This bureau also developed by far the best method for the production of phthalic anhydride, an essential in the making of dyes. This process, Mr. Howe states, has been recognised as the best devised, and arrangements have been made for its use in foreign countries. Synthetic drugs have been brought to the fore, and a number of them heretofore exclusively imported are now to be found made in this country. Research has also developed synthetic camphor, produced now on a large scale, while, simultaneously, quantities of camphor trees have been set out in the south-eastern part of the United States, with good reason to believe that before long the United States can care for a large portion of its requirements.

In connection with the textile industry, efforts are being made to standardise artificial methods of testing the light-fastness of dyes. The ultra-violet lamp has been somewhat successful, but it does not always produce the same effect as daylight. A carbon for an arc lamp was subsequently brought out, and with this a nearer approximation of daylight fading seems possible.

After many trials research has been successful in finding ways to eliminate borax from potash, and it seems assured that, having already reduced the borax to less than one-half of 1 per cent., potash will soon be produced practically according to specification.

Western smelters, finding it desirable to utilise their sulphur fumes, have devised a method for the production of double superphosphate, which can stand high transportation charges because of its concentration. Producing sulphuric acid cheaply makes it possible to manufacture syrupy phosphoric acid from available phosphate rock, and by treating another portion of the rock with the phosphoric acid this high value phosphate for fertilisers may be made.

Reviews

" THE ELECTRICIAN " ELECTRICAL TRADES DIRECTORY AND HANDBOOK. Benn Brothers, Ltd. 25s.

The 1920 edition of this old-established and valuable annual, known in the electrical industry as the " Big Blue Book," is now available at 25s. net. The publication of the present edition has been delayed owing to unfortunate printing and paper difficulties; but effective steps have been taken to ensure its regular publication in future. The new (38th) issue contains nearly 1,500 pages, or about 120 pages more than the previous one.

Both the Handbook and the Directory divisions have been carefully revised, and the present edition fully maintains its reputation as a reliable and accurate work of reference. The book covers every section of the important and growing electrical industry, and anyone engaged in any particular branch of it will find something of considerable interest to him. The contents of the book are so extensive that we can only give a brief outline of the ground covered.

There is a useful Digest of Patent Law and Practice, including the modifications made by the Patents, Designs and Trade Marks Acts of 1919, and this is followed by many electro-technical tables and commercial data, including particulars of electrical conductors, copper wire gauges, resistance wires, notes on illumination, international symbols, the standardisation rules for testing electrical machinery, interest and sinking fund tables, particulars of the import duties leviable on electrical machinery and apparatus in the British colonies and all foreign countries. The section relating to telegraphs and telephones gives much useful information relating to national and international telegraph and telephone services, including the International Telegraph Convention and Service Regulations, the constitution and duties of the International Bureau of the Telegraph Union, statistics of the length and conductors of submarine cables owned by British and foreign Governments and telegraph companies, and of the land lines of the world, telegraph tariffs, &c., also the wireless telegraphy regulations and legislation, a digest of law relating to British telegraphs and telephones, &c.

Another section gives particulars of the constitution and officers of the Institution of Electrical Engineers, together with officials and other information relating to British and foreign electrical and engineering societies directly or indirectly connected with the electrical industry. There is also a complete list of technical schools and colleges section, with the names of the professors and teachers in the faculties of engineering and applied science; lists of the chief officials of the British Government departments connected with electricity supply, traction and engineering, and of British railway engineers, &c., are also included.

There is a valuable digest of the law governing electricity supply and electric traction, including the whole of the regulations issued by Government departments controlling the use of electricity or the operation of electric railways and tramways, with the Home Office regulations for the use of electricity in factories and in mines. An abstract of the important Electricity Supply Act of 1919, the additional regulations of the Home Office for the use of electricity in mines (issued in March, 1920), as well as the current, wiring and ship lighting rules of the Institution of Electrical Engineers and the code of the Phœnix Fire Office are also included. The various regulations have been carefully revised, and as the Directory is the only annual publication which gives all the existing Departmental Regulations, this portion of the Handbook should prove invaluable to electric supply authorities and consumers, manufacturers of electrical plant, wiring contractors, &c.

The Directory portion has been greatly extended, and about 1,500 names have been added to the alphabetical list, which now contains nearly 20,000 entries. The Classified Trades Section has been reorganised; some duplicate headings of previous issues have been suppressed, and the principal headings have been greatly amplified and brought up to date. The part devoted to the Colonial and Foreign Sections has also undergone careful revision, and the whole forms, without doubt, the most reliable Directory and work of reference for the electrical industry.

" THE ELECTRICIAN " TABLES OF ELECTRICITY SUPPLY, &C. Benn Brothers, Ltd. 10s.

Those interested in the supply or use of electrical energy for lighting or power, or in the operation of electric railways or tramways, will be interested to learn that the 1920 edition of that useful publication " The Electrician " Tables of Electric Supply and Traction Undertakings is now available, price 10s. net. The Tables, which include the whole of the British electric supply authorities (Corporations and companies), and a comprehensive list of colonial and foreign undertakings, are published annually in May and are corrected to date. The information given includes the name of the supply authority and of the chief engineer, particulars of the system of generation and supply, the voltage at the consumers' terminals and frequency, details of the lighting connections (public and private), the motor load and plant capacity, price per unit for lighting, power and heating, &c. Including the power companies, there are about 700 supply authorities in Great Britain, an increase of nearly 50 over the previous year. The Tables are of great value to supply authorities and engineers for purposes of comparison, and also to manufacturers of electric motors, lamps and apparatus, wiring contractors and prospective consumers of electrical energy for lighting, power and heating, &c.

In regard to the Colonial and Foreign Section, the aim is to make the Australian, Indian, South African and South American statistics as complete as possible, and British manufacturers and exporters of electrical plant and apparatus will find the information, which is somewhat similar to that in the British section, very useful. Particulars are also included of the principal hydro-electric power schemes of the world, and of the colonial and foreign electric railways and tramways. There are about 950 entries in the Colonial and Foreign Section.

A scheme for the standardisation of wages in the LIVERPOOL OIL CAKE MILLS has been agreed between the Liverpool Seed, Oil & Cake Trade Association and the National Warehouse & General Workers' Union. The workers have been classified in five grades, each of which is rated at a specified minimum wage.

Japan's Progress in Dye-making

The following statement is contributed by a Japanese correspondent to our New York contemporary, "Drug and Chemical Markets." It shows the considerable progress which Japan has made in a period when the war activities of the European Allies and United States gave it an exceptional opportunity. The writer, however, confesses that Japan will be unable to compete against German dyestuffs, and that it will be difficult for her to hold her own against the newer producers of dyestuffs, such as the United States and Great Britain.

THE dye industry in Japan was practically non-existent prior to the outbreak of the war although the amount of dyestuffs used for cotton and silk textiles as well as for industrial purposes was considerable. The amount of dyes imported in 1913 totalled 10,000,000 kin, or 6,000 tons, valued at 8,000,000 yen. When the import of dyestuffs was stopped with the outbreak of hostilities something like a panic occurred among those who were dependent on German goods, and resulted in the starting of dye factories in Japan. At first the industry was confined to the production of comparatively simple stuffs with a large demand. These included red mordant alizarin manufactured by the Miike colliery factory; sulphur Yamato black made by the Yotagin dye factory of Okayama prefecture; Induline and Orange II. made by the Tokyo Gas Works; and aniline salt made by the Yura Seiko Goshi Kaisha, Tokyo Gas Works; and others. These were the products for 1915, and in 1916 sulphur black dyes began to be manufactured in Hiroshima and Okayama prefectures and yellow, orange, red and blue basic dyes, red direct dyes, violet, green and brown basic dyes in Tokyo, Osaka and Wakayama prefectures.

Aid From the Government

In view of the great rise in the price of dyestuffs and the growing scarcity the Government established in February, 1916, a subsidised concern, the Nippon Senryo Seizo Kaisha, for the encouragement of the dye manufacturing industry. Subsequently many dye factories were started at different parts of the country, and the industry has made remarkable development. In 1917 and 1918 various lines of dyes such as blue, green and black direct dyes, black acid dyes, pink and green basic dyes, and other acid and mordant dyes were made.

At the end of 1918 the number of dye factories throughout the country reached 100 with an aggregate paid up capital of 14,000,000 yen and employing 2,800 experts and workmen. The total output of dyestuffs for the same year amounted to 9,000,000 kin valued at 23,000,000 yen, which was about 90 per cent. of the value of dyestuffs Japan was importing when the war broke out. Different kinds of dyes turned out numbered about 80.

Raw Materials

The coal-tar industry in Japan was begun by the Tokyo Gas Co. more than 20 years ago, and for many years it had remained a monopoly of the company. Just prior to the outbreak of the war the industry was started by the Government Steel Works at Wakamatsu, Miike Colliery and Osaka Gas Co. The demand for the coal-tar product, however, had been limited until the outbreak of hostilities brought about an active demand for the manufacture of dyes and explosives. The increased demand for the coal-tar product in turn resulted in the production of benzol and toluol by various gas companies. In 1918 there were nine gas and other companies which were producing coal-tar products and their output for the year was 3,100 tons of pure benzol; 590 tons of pure toluol; 40 tons of pure xylol; 125 tons of carbolic acid (crystal); 1,400 tons of refined naphthaline; 160 tons of crude anthracene, making a total of 5,415 tons.

The demand for imported dyes in 1913 will be seen from the following figures; Aniline salt, 292 tons; aniline dyes, 4,383 tons; synthetic indigo, 983 tons; alizarin dyes, 95 tons, making a total of 5,753 tons. Comparing the output of the coal-tar product for 1918 and the demand for imported dyestuffs for 1913 it will be noted that the totals nearly agree, and therefore supposing that a ton of dyes can be manufactured out of a ton of refined material the dye industry in the country will not suffer for lack of raw materials.

Japan's Acid Production

In the manufacture of dyes sulphuric acid, nitric acid, muriatic acid and acetic acid are extensively used, and therefore their production and price have an important relation to the growth of the dye industry. Japan had been producing all these acids, except fuming sulphuric acid, in fairly large quantities since before the war, and their production has been materially increased since the war. As, however, the output of nitric acid depends upon the importation of Chilian nitrate, and in cases of international war its supply would be cut off, the Government, in co-operation with several private concerns, has established a provisional nitrogen laboratory and is carrying on researches as to the extraction of nitrate. As to fuming sulphuric acid, its manufacture was carried on only in the army and navy gunpowder factories before the war, but at present the Nippon Ryusan, Nippon Senryo, Mitsui Mining and other concerns are engaged in its manufacture.

Alkalis and other Necessary Products

On account of the great demand for caustic soda and soda ash and the high price they commanded a number of soda factories cropped up, while the soda factories on the Le Blanc process, which had been in existence, worked on their full capacity and cleared a large profit. Ammonia is produced in the country in large quantities, and caustic potash, though imported before the war, is now produced in the country.

The oxidizing agents bichromate of potash and bichromate of soda are also produced in the country, though the industry will require careful management now that the war is over and it will be confronted with foreign competition. Muriate of potash, muriate of soda, bleaching powder, arsenic acid, potash ferricyanide, permanganate of potash and peroxide of lead are manufactured in the country. Reducing agents, iron dust and zinc powder, are made by the Mitsui Mining Co. Sulphide of soda, bisulphite of soda, hydrosulphite, tin dust and chloride of tin are also available.

Salt, sulphur, nitrate of soda, acetate of soda, ethyl alcohol, methyl alcohol, formaldehyde, chlorine, and chloride of zinc can also be obtained in abundant supply.

The manufacture of phosphorous pentachloride, phosphorous pentoxide, and phosphorous trichloride will develop according to necessity as the manufacture of phosphorus by electrical process has greatly progressed in recent years. Barium carbonate, calcium carbonate and calcium chloride are now produced in the country. Copper powder, monochloride copper and copper sulphate were produced in large quantities even before the war.

In short, most of the subsidiary agents are produced in the country, though it is doubtful whether the manufacturers of caustic soda, soda ash and kindred products will be able to successfully stand foreign competition on account of the price.

Dye Factories and Products

With regard to distribution, most of the factories for making direct, basic, acid, acid mordant and oxidation dyes are situated in Tokyo, Osaka and Wakayama prefectures, while the manufacture of kryogene dyes is most extensively carried on in Hiroshima and Okayama prefectures. A large number of dye factories are also found in Kyoto, Fukuoka and Kagawa prefectures.

With regard to kryogene, oxidation, direct, acid and basic dyes Japan is already producing fairly numerous kinds in large quantity, and a fair amount of acid and mordant dyes. The principal dyes manufactured in Japan are as follows:—

Black oxidation dyes	Benzo Purplin 4 B
Orange acid dyes	Benzo Orange R
Violet basic dyes	Chrysodenine
Yellow acid dyes	Cotton Black R. W.
Red mordant dyes	Rhodamine
Red direct dyes	Naphthol Blue Black
Yellow basic dyes	Acid Alizarin Black R.
Orange direct dyes	Fuscamine
Yellow direct dyes	Sulphur Black T
Black direct dyes	Fast Red A
Pink basic dyes	Metanil Yellow
Black acid dyes	Induline
Black acid mordant dyes	Chrysamine G

Yellow oxidation dyes	Methylene Blue
Black kryogene dyes	Bismark Brown
Red acid dyes	Diamine Scarlet
Yellow acid dyes	Orange direct dyes
Blue acid dyes	Blue direct dyes
Yellow direct dyes	Blue kryogene dyes
Blue basic dyes	Brown acid dyes
Brown basic dyes	Yellow acid mordant dyes
Pink direct dyes	Brown oxidation dyes
Orange II.	Toluidine Orange
Methyl Violet B.	Diamine Blue B B
Naphthol Yellow	Kryogene Indigo
Alizarin	Naphthamine Brown
Congo Red	Alizarine Yellow G G
Chrysodine Y.	Paramine

Dyes mostly produced in Japan are sulphur black, black oxidation and violet basic dyes which are exported to China in a fairly large quantity. Red, yellow, blue, black and orange direct dyes, orange, red and yellow acid dyes, blue, brown and rhodamine basic dyes, blue sulphur and brown acid dyes are also produced in fair quantities. It is true that in certain lines of dyestuffs Japan is producing much more than she requires, but in other kinds, such as synthetic indigo and dyes high-class dyes, she produces practically nothing.

Cost of Production

Investigations have been made in respect to 20 to 30 dyes produced in the country, and a careful comparison has been instituted between the present price of Japanese dyes and of German dyes in the Japanese market before the war. As a result of a careful and impartial study it has been found that there are practically no Japanese dyes which can successfully compete with German products even with the help of tariff protection, and only a few kinds will survive German competition.

Comparing Japanese dyes with American it may be said that there are some which will be able successfully to compete with the latter, and that with the assistance of tariff protection most of the principal Japanese dyes may stand American competition. It should be remembered, however, that the United States is ahead of Japan in regard to the larger scale on which the industry is carried on and the varieties of dyes produced. In short, unless the Japanese dye manufacturers improve their industry it may become difficult to compete even with the American dye industry.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

Locality of Firm or Agent.	Materials.	Ref. No.
Cologne ...	Oil (including all kinds of edible oils), oil seed cakes.	965
Iceland ... (Hafnarfjorour)	Glass; china; pottery	967
Algeria ...	Glassware; acetylene fittings ...	975
Cuba	Plate and sheet glass	981
Central America	Glassware; varnish; paints ...	982
Montreal ...	Druggists' supplies; soap ...	8
Turkey (Samsoun)	Drugs; dyes; glassware; soap	24
Brussels ...	Sulphate of copper; bichromate of potash; carbonate of ammonia; salammoniac	12

Recent Wills

Mr. Watson Smith, F.C.S., F.I.C., of Upper Park Road, Haverstock Hill, N.W., lately professor of applied chemistry at University College, London, for some years editor of the *Journal of the Society of Chemical Industry*..... £693

Chemical Matters in Parliament

Mesopotamian Oilfields

Mr. Bonar Law, answering a number of questions with regard to the oil resources of Mesopotamia (House of Commons, July 1 and July 5), said: The method of development of the Mesopotamian oilfields is still under consideration. The Turkish Petroleum Company is registered in the United Kingdom, and the participation fixed before the war was Anglo-Persian Oil Company, 50 per cent.; Anglo-Saxon Petroleum Company, 25 per cent.; and Deutsche Bank, 25 per cent. The latter holding has been temporarily acquired by his Majesty's Government.

The Turkish Petroleum Co. was registered in 1912, and according to a recent work of reference, its directors are Messrs. Lancelot Smith, H. W. A. Deterding, C. S. Gulbenkian, and Sir C. E. Hambro. The rights claimed by the Company were granted in 1914. The capital of the company when it acquired the rights of the whole of the oil production of Mosul and Baghdad was £160,000 of which £80,000 was issued.

Mr. Ormsby-Gore asked (House of Commons, July 5) whether the concession granted by the Turkish Government to the Turkish Petroleum Company before the war was for rights to take all oil discovered, or to be discovered, in the provinces of Mosul and Baghdad in return for the payment of a lump sum down and a royalty on all oil taken, or other financial payment; what were the financial terms of the concession, and what payments would be made by the Turkish Petroleum Company to the Arab State of Mesopotamia for oil by way of royalty; whether the concession was for a limited number of years, and, if so, when was it renewable and on what terms; whether the British Government had appointed any directors on the board of the Turkish Petroleum Company to represent their interest in the concern; and whether they proposed to buy out the remaining shares of the Turkish Petroleum Company on terms similar to those embodied in the agreement regarding the purchase of the Pacific Phosphate Company's rights in Nauru Island?

Mr. Bonar Law: The rights granted to the Turkish Petroleum Company were as described by the hon. member, but no financial terms and no period to the concession had been fixed when war broke out. There are two directors on the board of the company nominated by the Government, in view of the ex-enemy interest acquired during the war.

Import of Silk Mixtures

Mr. A. Samuel asked the President of the Board of Trade (House of Commons, June 30) whether his attention had been drawn to the high rate of increase in the imports of silk mixtures from Switzerland for the five months ending May, 1920, which, compared with 1913 and 1919, are: 1913, 1,652,811 yards, £148,000 value; 1919, 369,042 yards, £84,000 value; and 1920, 11,968,988 yards, £3,460,000 value; whether he is satisfied that this very large quantity, imported in the first five months of 1920, is all made in Switzerland; whether he has been informed by British silk manufacturers that, if importation be continued on this scale, unemployment will be caused in the British silk industry, as it is engaged in large measure in the manufacture of similar mixed silk fabrics; and what steps he proposes to take to prevent our workpeople in the silk trade being thus thrown out of work?

Mr. Bridgeman: The quantities and values of the imports of silk mixtures were as stated by my hon. friend. I have no information as to the actual origin of the goods coming from Switzerland. The yardage of imports from all sources in the months referred to is about double that of 1913. I have not received any representation from manufacturers in this country on the subject, and cannot promise to take any steps.

Soap Confiscation

Replying to questions by Mr. Raper (House of Commons, July 6) regarding the confiscation by German authorities in Cologne of 50 tons of Watson's Matchless Cleanser Soap, value £5,000, which was shipped in error by the British Rhineland Navigation & Transport Co. per ss. "Jupiter," on April 21, after the shippers had given instructions not to ship on account of an import licence being required after April 18, Mr. Bridgeman said his attention had not previously been called to this case and asked for further particulars in order that the matter might be dealt with.

From Week to Week

MR. H. J. JOHNSON has been elected Master of the Tallow Chandlers' Company.

E. A. BERTHOUD of Magdalen College, Oxford, and H. R. O. EDMONDS, of Brasenose College, have been elected to the Goldsmiths' Company's Exhibitions in Chemistry.

The importation into France and Algeria of newsprint paper and CHEMICAL CELLULOSE PULP for manufacturing such paper has been prohibited by a French Presidential Decree.

HERR HERMANN SCHÜDDEKOPF, director-general of the German Potash Syndicate, who since 1905 has specialised in organising transatlantic trade, died at Berlin on Wednesday.

NOTTINGHAM CHEMICAL WORKERS have accepted the employers National offer of 5s. increase from July 1, rather than let the matter go to the Court of Arbitration and be delayed indefinitely.

CHIEF INSPECTOR H. C. BLACKWELL, of the Birmingham City Police, has been appointed head of the Explosives and Petroleum Department, under the various Acts, and given authority to make petroleum tests.

The French manufactured articles to be shown at the office of the FRENCH COMMERCIAL INTELLIGENCE DEPARTMENT, 153, Queen Victoria Street, E.C., from July 15-31 include scientific instruments, optical appliances, perfumery, sprays, &c.

The BADISCHE ANILIN UND SODAFABRIK is offering its recently issued bonds in the United States. The four-and-a-half per cent. bond is offered at $35 at the present rate of exchange, at the normal rate it would be valued at $240.

EXPLOSIONS in which 10 people were killed and about 30 injured occurred on Wednesday at the national gunpowder factory at Vonges, near Dijon. The explosions occurred at four buildings for the manufacture of perchlorate, which were entirely destroyed.

MR. HESSELL TILTMAN, B.Sc., has been appointed research assistant to the Research Association of British Rubber and Tyre Manufacturers. The Association has secured laboratory accommodation in the chemistry department of University College, Gower Street, W.C.

The UNIVERSITY OF LEEDS has awarded University Scholarships in colour chemistry and dyeing to G. G. Bradshaw and G. D. Spencer. The Leblanc medal for chemistry of leather has been awarded to W. E. Palmer. G. Mableson has been awarded a diploma in technology of colour chemistry.

The names of the under-mentioned JOINT STOCK COMPANIES have been struck off the Register, and are therefore dissolved: Molybdenum, Ltd., Northern Lac Bleaching Co., Ltd., Riverside Chemical Co., Ltd., Williams' Chemical Manufacturing Co., Ltd., World's Antiseptic Ammonia, Ltd.

The death took place on Friday, July 2, at his residence, Rook Hill, Bacup, of ALDERMAN LAWRENCE HEAP, head of Lawrence, Heap & Co., chemical manufacturers, Stacksteads. Mr. Heap, who was in his 61st year, had been a member of the Bacup Town Council for 16 years.

W. H. JACKSON, chemist, 157, Great Homer-street, Liverpool, was summoned at the police court, on Tuesday, for selling methylated spirits as a beverage, and fines amounting to £75 and £10 costs were inflicted. Four summonses had been taken out against the defendant, and the magistrates found the cases proved in three of them.

BRUNNER, MOND & CO., have undertaken to subscribe £50,000 to the Northwich Urban Council housing bonds, and also to subscribe an amount equal to that applied for by the public up to a further £50,000. They have presented the Council with a site in urban Winnington, and have agreed to subscribe £100,000 to Northwich Rural Council bonds.

THE FOLLOWING AWARDS have been made at University College, London: Research Studentships (Physics): H. E. Gibbs and J. Buckhurst. Tuffnell Scholarship (Chemistry): M. E. Goldstein; additional, C. W. Richardson; second year, H. Allen. Final Honours, Year, Gold Medal (Chemistry): P. A. Sporing and R. Huddart (value to be divided). Senior Class Prize, Gold Medal (Chemistry): F. M. Cray.

Four well-known firms are said to be interested in the Scottish glass trade combine which we announced in our last issue. The new company is to be known as the PORTLAND GLASS CO., and the capital, it is stated, will amount approximately to three-quarters of a million. In addition to the activities of the several firms involved at Glasgow, Edinburgh and Perth, arrangements have been made for the erection of new works at Edinburgh.

A general meeting of the members of the ROYAL INSTITUTION was held on Monday, Sir James Crichton-Browne, treasurer and vice-president, in the chair. The chairman announced that the institution had received a legacy of £5,000 from the late Dr. Rudolph Messel, who was a member for 30 years. The death of Professor A. Righi, an honorary member, was reported, and a resolution of condolence with the relatives was passed. Mr. A. E. Butler, Mrs. R. de l'Hopital, and Dr. W. A. M. Smart were elected members.

At Liverpool last week BROOK, PARKER & CO. (LTD.), manufacturing chemists, Bradford, were fined £10 and £21 costs for having sold to a Liverpool retail chemist saccharin tablets under a false trade description. The tablets were found on analysis to be deficient in strength to the extent of about 33 per cent. A similar charge was brought against F. W. Lomax, and W. S. Lomax, trading as Fred. W. LOMAX & CO., manufacturing chemists, Bridge Street, Manchester. Each defendant was fined £20 and 11 guineas costs.

The annual report of the GERMAN MINERAL OIL CO. refers to the great success attained in the last three years in extracting lubricating and heating oils from brown coal. Large brown coal mines have been bought up with this aim, and as the annual output of brown coal is about 100,000,000 tons, and is rapidly increasing, it is calculated that Germany will ultimately be able to get along with very small imports of petroleum. The brown coal extraction process was known before the war, but was put into force first in 1916, when the shortage of lubrications threatened to stop the whole German war machine.

AN INQUEST was held at Southampton last week on J. D. Hume, an oil fuel expert, of South Shields, who sustained injuries during the recent voyage of the White Star liner Olympic from Belfast to Southampton, and died in hospital. An oil fuel fitter named W. Noble spoke of seeing Hume in an alleyway all in flames. Going to his assistance, he ascertained that the fire was caused by oil coming into contact with a lighted torch in the stokehold. By some means one of the valve covers had become unscrewed, and oil spurted into the stokehold. A verdict of accidental death was returned.

The *Nottingham Journal*, of which Sir J. Boot is the chairman, states that a new company with a capital of £10,000,000 has been formed for the purpose of carrying out a working agreement between the American United Drug Company, of the United States, and the BOOTS PURE DRUG COMPANY. Sir J. Boot and his son will retain their seats on the directorate, and the heads of all departments are being retained. The alliance is the result of a decision by the American company, which has been doing business in England for eight or nine years, to open a number of retail shops. The amalgamation will have the effect of saving expenses.

IT IS ANNOUNCED that arrangements are being made to combine the Anglo-Roumanian, the Traian-Roumanian, and the Phœnix Oil and Transport Companies. A new company will be found with a capital not exceeding £2,050,000, divided into 2,000,000 shares of £1 each, which will be entitled to 75 per cent. of the profits, and 1,000,000 shares of 1s. each, carrying 25 per cent. of the profits. A London group of financiers, who are desirous of obtaining not less than 51 per cent. of the Traian-Roumanian and Anglo-Roumanian Companies, will, it is stated, guarantee that £500,000 shall be subscribed in cash. One fully-paid £1 share of the new company will be exchanged for every two £1 shares now held.

MR. W. FOSTER, of B. Foster & Sons, chemical manufacturers Leeds, died on Saturday, July 3, at his residence 8, St. Martin's Terrace, Chapeltown, Leeds. Mr. Foster, who was in his 72nd year was probably the last prussiate maker south of the Tweed. His father and brothers were makers of yellow prussiate before him, and he carried on the family tradition until the industry was entirely captured by the Germans. He was always strongly of opinion that as a key to the aniline dye industry the manufacture of prussiate ought to be revived in this country, and during the war he was often pressed to re-embark upon its manufacture. He felt, however, that he was too old to start again.

References to Current Literature

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AMMONIUM SULPHATE. Moisture and sulphate of ammonia. J. T. Sheard. *Gas World (Coking Sect.)*, July 3, 65-66. The hygroscopic properties of sulphates of different acidity have been examined.

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REFRACTORIES. Porosity and volume change of fireclay bricks at furnace temperatures. G. A. Loomis. *Gas World (Coking Sect.)*, July 3, 66-69. A report of an investigation by the U.S. Bureau of Standards.

French

ANALYSIS. Determination of cyanamide and dicyandiamide in a calcium cyanamide. M. Marqueyrol, P. Loriette and L. Desvergnes. *Ann. Chim. Analyt.*, June 15, 164-167.

Determination of phosphorus in tin bronzes. L. Bertiaux. *Ann. Chim. Analyt.*, June 15, 167-168.

Determination of caffeine in mixtures of coffee and coffee substitutes. E. Vautier. *Ann. Chim. Analyt.*, June 15, 168-172.

Application of a new physico-chemical method to the examination of double salts. R. Dubrisay. *Comptes rend.*, June 28, 1582-1584. The method is described as applied to double sulphates.

FERROSILICON. Industrial ferrosilicons. J. Hebert. *Techr. Moderne*, May, 193-199. An account of the manufacture, properties and uses of ferrosilicons.

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MUSTARD GAS. The toxic action of dichloro-diethyl sulphide. A. Mayer, H. Magne and L. Plantefol. *Comptes rend.*, June 28, 1625-1628.

United States

ANALYSIS. Use of paranitraniline to standardise solutions of sodium nitrite. W. H. Bell. *Chem. & Met. Eng.*, June 23, 1173.

COPPER. Copper and magnetite in copper smelter slags. C. G. Maier and G. D. Van Arsdale. *Chem. & Met. Eng.*, June 23, 1157-1162. Conclusion of article already noted. (THE CHEMICAL AGE, III., 14.)

FILTRATION. Scientific control of the filter station. A Wright. *Chem. & Met. Eng.*, June 23, 1165-1167. The discharge of cakes from filter presses is discussed. (*See also* THE CHEMICAL AGE, II., 697; III., 14.)

HYDROCHLORIC ACID. Production of hydrochloric acid from chlorine and water. H. D. Gibbs. *J. Ind. Eng. Chem.*, June, 538-541.

ITALY. The chemical industry and trade of Italy. O. P. Hopkins. *J. Ind. Eng. Chem.*, June, 525-531.

METALS. Apparatus for determining the porosity of metals. F. K. Bezzenberger and R. A. Wilkins. *Chem. & Met. Eng.*, June 2, 1031-1032.

NITROCELLULOSE. Measurement of the viscosity of pyroxylin solutions. E. F. Higgins and E. C. Pitman. *J. Ind. Eng. Chem.*, June, 587-591.

NITROGEN OXIDES. The absorption of nitrogen oxides by nitric acid. E. K. Rideal. *J. Ind. Eng. Chem.*, June, 531-538.

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The composition of oil of chenopodium from various sources. E. K. Nelson. *J. Amer. Chem. Soc.*, June, 1204-1208.

PYROMETRY. The potentiometer in pyrometry. C. P. Frey. *Chem. & Met. Eng.*, June 23, 1168-1170.

SMOKE. Smoke litigation in Salt Lake Valley. E. E. Thum. *Chem. & Met. Eng.*, June 23, 1145-1150. An interesting account of recent smelter fume problems.

VAPOURS. Pressure and temperature relations for vapours of liquids. P. B. Williamson. *Chem. & Met. Eng.*, June 23, 1151-1155. Useful mathematical formulæ on the subject are given.

VISCOSIMETRY. Chart f viscosities in different systems. H. G. Nevitt. *Chem. & Met. Eng.*, June 23, 1171. The chart shows the corresponding figures for the Saybolt, Redwood and Engler viscometers and absolute viscosity.

German

ACIDS. Review of the mineral acid industry in 1919. K. Reusch. *Chem.-Zeit.*, July 1, 485-486. The literature on sulphuric acid production is reviewed.

ANALYSIS. A rapid method for the estimation of hydrocarbons in light petroleum and benzine. W. Hess. *Z. angew. Chem.*, June 15, 147-148.

Estimation of carbon dioxide in moor waters. V. Rodt. *Chem. Zeit.*, June 24, 469.

Estimation of hydrocyanic acid in beans. A. Czapski. *Z. anal. Chem.*, Vol. 59, Nos. 2-3, 80.

The sensitiveness and applicability of qualitative reactions. I. The potassium-ion. O. Lutz. *Z. anal. Chem.*, Vol. 59, No. 4, 145-165.

ANALYSIS. Estimation of oxalic acid. A. Bau. *Woch. Brau.*, June 26, 217-219. Conclusion of article noted previously. (THE CHEMICAL AGE, II., 697.)

Detection of oxalic acid and lactic acid, especially their differentiation from tartaric acid. K. Brauer. *Chem.-Zeit.*, July 3, 494.

Estimation of oxygen in iron. P. Oberhoffer and O. v. Keil. *Stahl u. Eisen*, June 17, 812-813.

APPARATUS. The standardisation of laboratory apparatus. F. Friedrichs. *Z. angew. Chem.*, June 22, 151-156. Suggestions are made for standard forms of separating and filter funnels, flasks with side tube, cocks, &c.

ELECTROMETALLURGY. Electrometallurgy of the light metals in recent years. F. Peters. Glückauf, May 29, June 19 and 26, 437-439, 492-499, 514-517. Further portions of review already noted (*Chem. Age*, 1920, 641).

EMULSIONS. The separation and examination of oil emulsions. K. Glaser. *Feuerungstech.*, June 15, 149-153.

EVAPORATION. The use of condensed vapours for evaporation. K. Schreber. *Chem. Zeit.*, June 24, 469-470. The economic aspect of the process is discussed.

EXPLOSIVES. Dicyandiamide as an explosive. J. Baumann. *Chem. Zeit.*, June 26, 474.

GAS. Heat-balance of a double-gas generator. H. Strache, A. Breisig and A. Gross. *J. Gasbeleucht*, June 19, 399-405.

HEATING. The use of acetylene for heating in the laboratory. I. Naumann. *Z. angew. Chem.*, June 15, 148.

IRON. The corrosion of iron. R. Kattwinkel. *Z. angew. Chem.*, June 22, 156. The formation of magnetic iron oxide during rusting is recorded.

ORES. Contribution to the practice of the flotation process. W. C. Mewes. *Metall. u. Erz.*, June 22, 274-278. Data as to the various oils used, and temperature and other conditions of the process are given.

POTASH. The development and prospects of the potash industry in Alsace. P. Kriche. *Chem. Ind.*, June 23, 288-291. Conclusion of article previously noted (*Chem. Age*, 1920, 697).

SLAGS. Studies with blast-furnace slags. H. Burchartz. *Stahl u. Eisen*, June 17, 813-819. Tests of different slags and concretes, &c., from them are described.

Miscellaneous

STEEL. The structural constitution of high-speed steel containing chromium and tungsten, and the effect of these elements on its hardening and tempering. K. Honda and T. Murakami. *Sci. Rep. Tohoku Imp. Univ.*, April, 143-168. A valuable paper, with several plates of curves and photomicrographs.

Patent Literature

Abstracts of Complete Specifications

143,973. SULPHATE OF COPPER FROM ORES CONTAINING COPPER, PRODUCTION OF. J. S. Ross, 1, Morpeth Terrace, Westminster. Application date, March 6, 1919.

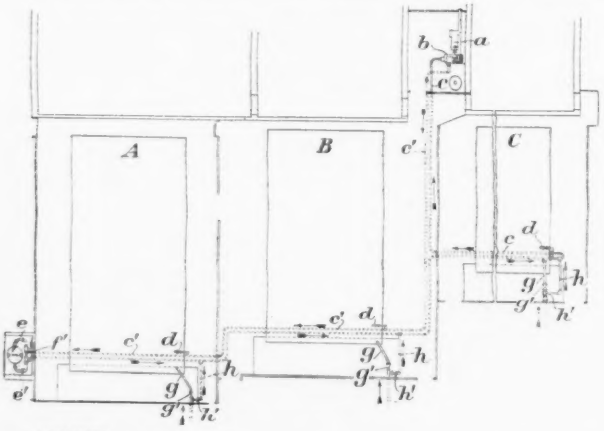
The object is to obtain copper sulphate direct from carbonate ores containing copper, and also other metals such as gold, silver, lead, cobalt, nickel, zinc, iron, and arsenic. The raw ore is treated with a 5 per cent. solution of sulphuric acid until the solution is sufficiently rich in copper, when it is mixed with a further quantity of the raw ore until the solution becomes basic. The solution, which is free from arsenic and from most of the iron, is boiled until its density is about 52°Tw., a basic substance such as copper oxide being continuously added to keep the solution basic. Air, with or without dry or superheated steam, is forced through the solution during boiling, and most of the solid matter is precipitated then or during the subsequent cooling. The resulting solution may then be subjected to electrolysis to deposit the copper, or may be otherwise utilised. The boiling and cooling may be repeated if necessary, in order to obtain a pure copper sulphate solution. The residues may be treated in any suitable manner for the recovery of the other metals.

144,022. ROCK SALT, PROCESS FOR PURIFYING. L. W. Damman, Groot Wezenland 39, Zwolle, Holland. Application date, September 16, 1919.

Rock salt is purified without dissolving and without the use of large quantities of liquid for washing. The crude salt is ground into grains of about 1 mm. in size and the finer material separated by sieving. The finer material contains a larger proportion of the impurities owing to their greater brittleness, and the proportion of impurities in the granular material is thus reduced to about one-half the original. The partly purified material is then treated on an inclined sieve immersed in saturated brine and the heavier particles, such as calcium and magnesium sulphates, settle on the lower part of the sieve, while the pure salt remains above. The mesh of the sieve is sufficiently fine to prevent the passage of any solid material. As an alternative, the granular salt may be separated by moving it against the flow of a saturated solution of salt, so that the heavier impurities fall to the bottom and the lighter salt remains suspended. The resulting salt is sufficiently pure for table use.

144,023. SALT FROM BRINE, EVAPORATING PLANT FOR THE MANUFACTURE OF—AND FOR OTHER LIKE PURPOSES. M. Allen, Carlton Lawn, Chester Road, Stretford, Manchester. Application date, April 9, 1919.

The object is to prevent the deposit of gypsum scale which



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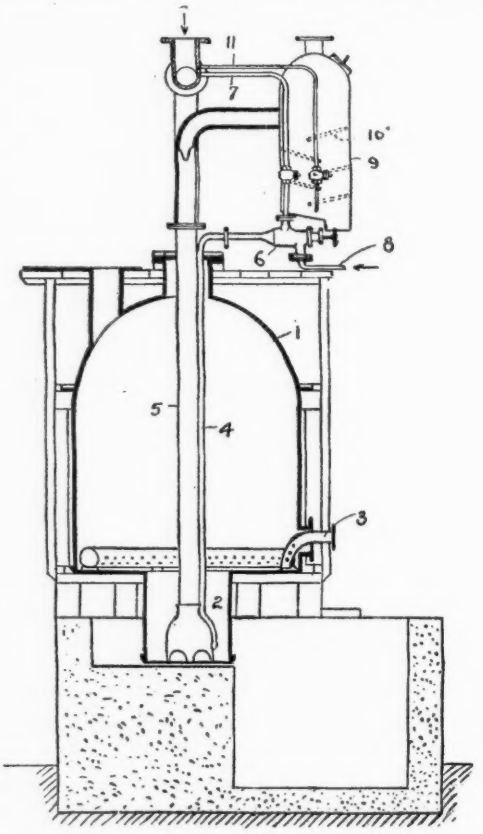
occurs when brine is evaporated in open pans, and to prevent the furring of the circulating pipes. The plant is shown in plan view, the three open pans A, B, and C being provided with separate heating furnaces. A power unit *a*, such as a steam engine, drives a pump *b*, which circulates brine through the flow and return pipes *c*, *c'*, as shown by the arrows. These pipes are arranged to pass through all the furnaces so that the brine is heated to a high temperature. Valves *d* are provided on branch pipes from the return pipe *c'* so that the hot brine may be discharged into any of the pans. The brine passes from the pipe *c'* into a settling tank *e* at the top, then downwards under a vertical partition *e'* and upwards to the circulating pipe, so that solid matter is deposited in the tank. The tank may be cut out of the system by the provision of a by-pass valve *f'*. In normal working, the brine passes by branch pipes *h* and valves *h'* into the pipe *c*, but each pan may be fed directly with cold brine under pressure when desired, through the valves *g'* and pipes *g*. The more rapid circulation of the brine through the preliminary heating pipes by the pump prevents deposition in the pipes, and the greater part of the gypsum, sand, &c., is deposited in the tank *e*, thus avoiding scale deposits in the pans A, B, C. Any one of the pans may be cut out of the system when desired, for cleaning or other purposes.

144,030. AMMONIUM SULPHATE, MANUFACTURE OF. S. M. Shadbolt, 74, Manor Lane, Lea, and J. E. Grainger, The Lennards, Rainham, Essex. Application date, April 16, 1919.

The object is to obtain ammonium sulphate crystals free from acid. Mother liquor from the separator is returned to the saturator 1 through the pipe 3 in the usual way, and the



144,030

crystals of ammonium sulphate are lifted from the well 2. Instead of supplying steam only through the pipe 4 to lift the crystals through the pipe 5, ammonia with or without some steam is used in order to neutralise the acid in addition. The ammonia may be derived from the ammonia main through a connection 7, and may be injected by a steam injector 6 supplied through a pipe 8. The delivery pipe 5 discharges

into a neutralising chamber 9 having baffles 10, and the crystals and liquor are treated with ammonia gas supplied by the pipe 11, excess of gas being drawn off at the top. Separate treatment of the crystals after centrifuging, to neutralise them, is thus rendered unnecessary.

144,051. RETORTS FOR THE DISTILLATION OF CARBONACEOUS MATERIALS. J. West, Alton Lodge, Park Crescent, Southport; W. Wild, Beechwood, Newton Drive, Blackpool; and West's Gas Improvement Co., Ltd., Albion Ironworks, Miles Platting, Manchester. Application date, May 7, 1919.

A number of horizontal or inclined retorts are arranged one above the other, and are fed with fuel at one end. Coke is discharged at the other end into a common vertical or approximately vertical chamber, and gas is drawn off from each retort adjacent to the fuel inlet. A steam pipe is built into the wall of the vertical coke chamber so that highly superheated steam is delivered into the bottom of the coke chamber, and is converted into water gas during its upward passage through the incandescent coke. The water gas passes through the horizontal retorts towards the fuel inlets and carries off the gas generated in the retorts. The coke may be discharged intermittently from the vertical chamber, the discharging operation being immediately followed by a discharge of the coke from the horizontal retort into this chamber, and a recharging of the retorts. The retorts may be worked continuously, the coke being withdrawn either continuously or intermittently from the vertical chamber. The retorts may be heated externally by combustion products from a separate furnace, the gases then passing through flues around the coke chamber and finally through a regenerator in which secondary air for the combustion chambers is preheated. The coke received into the vertical chamber remains hot sufficiently long for the production of water gas.

144,079. ALCOHOL, MANUFACTURE OF. A. B. C. Rogers, 44, Duke Street, St. James' Square, London; and Sir C. H. Bedford, Oak Tree Cottage, Woking, Surrey. Application date, May 27, 1919.

Alcohol is manufactured from rice straw and husk, which is of small commercial value and obtainable in very large quantities. The material is first placed in a basket arranged above a steaming chamber or vat and subjected to preliminary treatment by the steam rising from the vat below. The softened material is transferred to the vat and again treated with steam which is preferably superheated. Hydrochloric acid or a mixture of calcium hypochlorite and chlorine, with or without steam, is also sprayed into the vat, and the fibres are thus disintegrated and hydrolysis of the starchy and other carbohydrates is started. The material is then pulped and treated with dilute hydrochloric acid of 0·5 to 2·0 per cent. strength with or without increased pressure and heating to complete the conversion of the starch and cellulose into sugar. About one-third of the pulp is thus dissolved, and the solution is neutralised and then fermented with yeast to produce alcohol. The alcohol is then distilled off and condensed.

144,084. SULPHITE AND LIKE DIGESTERS, METHODS OF HEATING. J. K. Ruths, Djursholm, Sweden, and Aktiebolaget Vaporackumulator, 18, Lästmakaregatan, Stockholm. Application date, May 29, 1919.

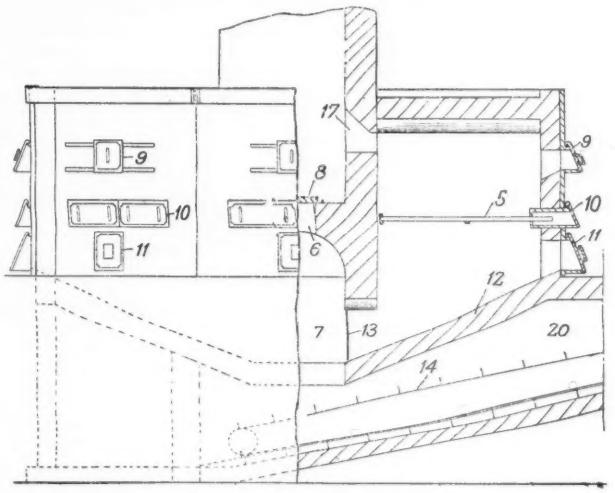
The object is to reduce the steaming period in cellulose sulphite manufacture, in apparatus in which an accumulator is arranged between the steam generators and the sulphite digesters. The steaming operation and the starting of the digesting operation are effected by using steam obtained from an accumulator at a low pressure. Larger heating tubes are employed and a greater quantity of steam is used, the temperature along the tubes remaining practically constant. The digesting operation is then completed with steam of higher pressure.

144,133. COAGULATING RUBBER LATEX. T. Burney, Holland House, Bury Street, City of London. (From E. Nixon-Westwood, care of Hong Kong and Shanghai Banking Corporation, Singapore). Application date, July 30, 1919.

The coagulating tank is made in sections which may be bolted together, and is provided with a number of vertical sliding partitions dividing it into a number of narrow compartments. The latex and acid are fed into the tank when the partitions are withdrawn, and are then mixed and the partitions replaced to form the coagulated rubber into sheets. The tank and partitions are enamelled with acid-resisting material. About 30 sheets of coagulated rubber are obtained at one operation.

144,142. PYRITES, KILNS FOR. J. L. Fairrie, 2, Croxteth Road, Liverpool. Application date, August 14, 1919.

A number of sector-shaped kilns are arranged in a circle, and the illustration shows a vertical diametral section. The usual kiln doors 9, 10 11, are arranged around the circumference of the setting, and the grate bars 5 are arranged radially. The floor 12 below the grate bars slopes downwards towards a common cylindrical pit 7, which is closed by brickwork at about the level of the grate bars. A central opening 6 is controlled by a cover 8, and secondary air may, if necessary,



144,142

be admitted by this means. All the kilns discharge into the central space above the chamber 7 by means of flues 17, and all the kilns are thus subjected to the same draught. The residue passes into the chamber 7 through a swing door 13, operated from outside, and an endless conveyor 14 is arranged in a tunnel 20 below one of the kilns to discharge the residue continuously or intermittently into an elevator. The residue reaches the elevator through a short side tunnel so that the elevator may be arranged at the side, and the conveyor withdrawn when required without disturbing the other parts.

144,176. OILS OR FATS, PROCESS FOR NEUTRALISING. A. G. Bloxam, London. (From Mario Arbini, 55, Feierabendstrasse, Basle, Switzerland.) Application date, October 17, 1919.

Oil, such as maize oil or whale oil, which contains free fatty acid, is mixed with the correct amount of dry caustic soda or calcined sodium carbonate to neutralise such acid. Solid soda soap separates out and the clear neutral oil remains unaffected. When the reaction is complete, the water produced is drawn off by vacuum or absorbed by calcined sodium sulphate, and the oil is dissolved in a water-free solvent such as methylal, ether, methyl acetate, carbon bisulphide, or acetone. The oil solution is obtained by filtering off the soap, and the solvent may then be distilled off. Alternatively, the solvent may be present in the oil before the alkali is added. The neutral oil may be bleached by substituting for the caustic alkali or alkali carbonate the corresponding peroxide or percarbonate.

NOTE.—Specification 136,834 (Soc. Industrielle de Produits Chimiques), which is now accepted, was abstracted when it became open to inspection under the International Convention. It relates to a process for recovering ammonia from coke-oven and like gases. (*See* THE CHEMICAL AGE, Vol. II., page 210.)

International Specifications Not Yet Accepted

142,122. ALKALI CYANIDES. H. Mehner, 52, Schloss-strasse, Charlottenburg, Berlin. International Convention date, October 9, 1914.

An alkali metal such as sodium is vaporised and mixed with carbon monoxide, and reacts upon carbon, nitrogen, and an alkali metal compound to produce alkali cyanides. The mixture of sodium and carbon monoxide may be used to draw in the powdered alkali metal compound.

LATEST NOTIFICATIONS.

145,408. Tar of aliphatic compounds or low temperature tar, Method for producing. G. A. Pestalozzi. June 20, 1919.
145,415. Resin from solvent naphtha. G. S. Walpole. February 1, 1916.
145,511. Cellulose acetates, Manufacture and production of solutions of. Badische Anilin and Soda-Fabrik. February 9, 1914.
145,514. Plastic masses, Process for the manufacture of—and new industrial products obtained therefrom. L. Gauthier. April 18, 1919.
145,522-3. New sulphurised dyestuffs. Akt.-Ges. für Anilin-Fabrikation. January 21, 1914.
145,524. Cellulose esters of organic acids, Manufacture of. Akt.-Ges. für Anilin-Fabrination. July 11, 1914.
145,525. Cellulose acetates. Akt.-Ges. für Anilin-Fabrikation May 30, 1918.

Specifications Accepted, with Date of Application

124,194. Acetic aldehyde from acetylene as the primary material. Catalyst for the manufacture of—and process of regeneration of the catalyst. Soc. des Acieries et Forges de Firminy. March 13, 1918.
124,445. Corrosive fluid valves. Chemical Equipment Co. March 13, 1918.
125,584. Asymmetric ureas, Process for the manufacture of. A. V. Blom. April 17, 1918.
126,614. Furnace retorts. C. H. Smith. May 9, 1918.
131,272. Caustic soda from residues recovered from the alkali used in pulp digestion and containing sodium carbonate. Dorr Co. August 16, 1918.
141,661. Oxygen compounds of sulphur and especially sulphur dioxide mixed with sulphur trioxide, Apparatus for the manufacture of. T. A. Clayton. April 11, 1919.
144,751. Hydrogen, Manufacture of. British Oxygen Co., S. W. Bray and I. H. Balfour. February 14, 1919.
144,802. Electrically heated furnaces. Morgan Crucible Co., and C. W. Speirs. March 17, 1919.
144,806. Arsine derivatives, Process for the preparation of. A. Job and H. Guinot. March 18, 1919.
144,815. Rotary furnaces, retorts and the like. E. H. Summers and E. S. Whittard. March 21, 1919.
144,819. Lead Salts, Method of and apparatus for producing. W. J. Mellersh-Jackson. (*E. A. Sperry*). March 21, 1919.
144,868. Gas, Process of making. D. E. Campbell. May 29, 1919.
144,869. Sulphuric acid, Process and apparatus for the removal of arsenic from. G. E. Clark. May 29, 1919.
144,897. Carboxyl groups, Process for the elimination of. J. E. Marsh. July 14, 1919.
144,961. Filtration membrane, Process of treating. J. F. Wait. December 2, 1919.
144,979. Centrifugal dryers. G. H. Elmore. February 6, 1920.
144,989. Producer gas, Process for the enrichment of. C. Griffin. April 15, 1920.

Applications for Patents

Akt.-Ges. für Anilin-Fabrikation. Artificial fertilisers. 17,608 June 28. (Germany, January 29, 1918.)
,, Oxyaryhaldehydes. 17,719. June 29. (Germany, February 6, 1918.)
,, Artificial fertilisers. 17,720. June 29. (Germany, March 16, 1918.)
,, Dyestuffs of the acridine series. 18,202. July 2. (Germany, April 22, 1915.)
Aktieselskabet Hoyangsfaldene Norsk Aluminium Co. and F. W. Howorth. Aluminium oxide. 17,765. June 29.
Aragay, J. M., and Bonneau, C. L. Caustic soda and hydrochloric acid. 18,267. July 2. (Spain, January 30, 1919.)
Ayestaran é Irazusta, L. Conglomeration of pulverulent mineral residues. 17,690. June 29.
Baker, W., Nightingale, D. A., and British Cellulose & Manufacturing Co. Aromatic derivatives. 18,114. July 2.
,, Alkyl derivatives. 18,115. July 2.
Badische Anilin & Soda Fabrik. Tanning preparations. 18,467. July 3. (Germany, February 19, 1919.)
Bale, G. F., and Perkin, F. M. Destructive distillation of carbonaceous material. 18,145. July 2.
Bengough, R. Water-insoluble compounds of the alkalies, &c. 18,311. July 2. (Germany, February 23, 1915.)
Bennert, C. Dye vats. 17,945. June 30. (Germany, December 24, 1915.)
Bloomfield, A. L. Still. 18,108. July 2.
Bonnard, G. Refining tin and antimony. 18,179. July 2. (U.S.A., March 15.)
British Dyestuffs Corporation, G. Imbert and H. Levinstein. Phenyl glycine. 18,278. July 2.
Brownlee, R. H. Treating hydrocarbon oils. 17,578. June 28. (U.S.A., July 11, 1917.)
Chemische Fabriken vorm. Weiler-Ter Meer. Centrifugal pumps for acids. 18,203 and 18,396. July 2. (Germany, September 28, 1916, and November 19, 1917.)
Clerc, C. Zinc sulphide. 18,398. July 2. (France, May 20, 1919.)
Collin Akt.-Ges. zur Verwertung von Brennstoffen und Metallen, F. J. Ammonium sulphate from cyanogen compounds. 17,974. June 30. (Germany, May 17, 1919.)
,, Discharging ammonium sulphate from saturators. 18,165. July 2. (Germany, April 2, 1919.)
,, Sealing retorts, &c. 18,166. July 2. (Germany, April 28, 1919.)
Dahl, E. W. White lead. 18,079. July 2.
Dempster, R. and J., Knight, G. B., and Siddall, F. J. Generating and heating plant for hydrogen manufacture. 18,438. July 3.
Du Pont de Nemours & Co., E. I. Alkyl anilines. 18,085. July 2. (U.S.A., July 7, 1917.)
Elektro-Osmose Akt.-Ges. (Graf Schwerin Ges.) Extracting materials. 18,521. July 3. (Germany, July 3, 1919.)
Freytag, W. Washing gases, &c. 18,319. July 2. (Germany, August 19, 1918.)
Friederich, W. Trinitroresorcine. 18,362. July 2.
Goldberg, P. Copper and nickel ores, Electrolytically working. 17,760. June 29. (Germany, July 9, 1918.)
Goldschmidt Akt.-Ges., T. Separating constituents of distillation gas. 18,266. July 2. (Germany, October 26, 1917.)
Hunt, S. B. Alcohols, esters, &c., from gaseous hydrocarbons. 17,940–1. June 30.
,, Converting secondary alcohols into ketones. 17,742. June 30.
Kolshorn, E. Compounds of tannic or gallic acids and lactic acid. 17,554. June 28. (Germany, June 13, 1919.)
,, Derivatives of *p*-aminophenol and its *o*-alkyl ethers. 17,780. June 29. (Germany, June 13, 1919.)
Lance, R. D. Extracting metal oxides from pyritic ores. 18,380. July 2. (France, May 16, 1916.)
Lidholm, J. H., and Wargöns Aktiebolaget. Cyanamide from calcium cyanimide. 17,983. June 30. Sweden, September 19, 1919.)
Moeller, F. Treating cellulose. 17,776–7. June 29. (Germany, August 22, 1918, and February 24, 1919.)
Nelson, J. Cracking hydrocarbon oils, &c. 18,524. July 3.
Otsuka, E. Concentrating ores by flotation. 18,378. July 2. (Germany, December 30, 1917.)
Reichsausschuss für Pflanzliche und Tierische Oele und Fette Ges., and Jeroch, W. Utilising spent sulphite cellulose lyes. 18,477. July 3. (Germany, January 24, 1917.)
Soc. Rocca, Tassy, et De Roux. Neutralising oils and fats. 17,539 and 17,540. June 28. (France, November 13, 1919, and May 3, 1920.)
Teichner, G. Nickel catalysts. 18,394. July 2. (Germany, November 10, 1916.)
Wehmer, C. Fumaric acid. 18,400. July 2. (Germany, September 28, 1915.)
Wohl, A. Converting cellulose-containing materials into soluble carbohydrates. 18,526. July 3. (Germany, March 14, 1917.)

BRITON FERRY CHEMICAL.—An extraordinary meeting of the Briton Ferry Chemical and Manure Company will be held on Tuesday, July 13, to pass a resolution increasing the capital from £225,000 to £300,000 by the creation of 75,000 £1 shares, 50,000 to be ordinary and the remaining 25,000 to be seven per cent. cumulative preference shares. The shareholders have been informed that in consequence of constantly rising prices of materials and labour the cost of construction and erection of the new fertiliser plant at Briton Ferry will exceed the original estimates, and that owing to this increased cost, and to the fact that additional plant, advisable for improved working and increased economy, has been ordered, the capital last issued will be insufficient to complete the work. It thus becomes necessary to increase the capital. The prospects of the fertiliser industry indicate that the plant will add materially to the profits of the company, which will be further beneficially affected, owing to increased efficiency, by the additional plant now under construction. As soon as the capital of the company is increased the new shares will be offered to the shareholders.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co. and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

Market Report

THURSDAY, July 8.

The home trade market continues quietly steady. The demand for many chemicals is on the slow side. Values, however, are in the main unchanged, and the undertone is firm. A fair volume of business is passing on export account, without anything of special to note.

General Chemicals

ACETONE is in steady demand, and is without change in price.

ACID ACETIC is passing steadily into consumption, and the price is firm.

ACID CARBOLIC is a shade easier in price.

ACID CITRIC is stagnant and price continues to show a drooping tendency.

ACID FORMIC is unchanged and is in quietly steady demand.

ACID LACTIC is without feature and price is inclined to be easier.

ACID OXALIC is scarce for prompt delivery, and there is no change in price at present.

ACID TARTARIC.—The price remains firm with only a light business passing.

AMMONIUM SALTS are all in good demand, especially on export account.

BARIUM SALTS.—There is only a moderate inquiry to report, with prices in the main unchanged, although chloride may be a shade easier.

ARSENIC.—Large export inquiries are in the market and a fair business has been transacted. Cornish material is very firm, and parcels of foreign production are offered for arrival at lower figures.

COPPER SULPHATE is lifeless, and price still continues to sag.

FORMALDEHYDE is still scarce for prompt delivery and is very firm.

IRON SULPHATE is only moderately active, without change in values.

LEAD SALTS are on the easy side, mainly owing to the light demand, but with the improvement in the metal, the tendency is healthier than it has been of late.

LITHOPONE is in better demand and price is without change.

POTASSIUM CARBONATE is working off very well, and stocks appear to be light.

POTASSIUM CHLORATE is idle and price is inclined to be easy.

POTASSIUM NITRATE is more active and value well maintained.

POTASSIUM PERMANGANATE is unchanged in price, and there appears to be slightly more material on the market.

POTASSIUM PRUSSIATE continues scarce for early delivery. Yellow may be taken as a shade firmer. The demand for red is also better, and the price is steady.

SODIUM ACETATE is only working off slowly, and is nominally without change.

SODIUM BISULPHITE is very active, but early delivery cannot be given.

SODIUM CAUSTIC.—There is a good demand for export, and the price is fully maintained.

SODIUM HYPOSULPHITE is almost unobtainable for spot delivery, and the value continues exceedingly firm.

SODIUM NITRITE is unchanged in value, but is only in very slow demand.

SODIUM PHOSPHATE is extremely firm and scarce for near delivery.

SODIUM PRUSSIATE is quietly easier, but as the production is limited, any improvement in the demand will be reflected in the price.

SODIUM SULPHIDE is without change and continues exceedingly scarce and dear for near delivery.

STRONTIUM SALTS are steady and there has been an improvement in the demand for nitrate.

SULPHUR CHLORIDE is moving off very well at last quoted figures.

TIN SALTS are only in very poor demand, but price is nominally without change.

ZINC SALTS are without feature, but an improvement in the demand for sulphate is to be noted.

Coal Tar Intermediates

This market is in the main without change, and there is nothing fresh to report.

ANILINE OIL and SALT are in good demand on export account.

BETA NAPHTHOL continues scarce and firm in price.

DIPHENYLAMINE is moving off steadily at last quoted figures.

NAPHTHIONATE OF SODA is inquired for, but early delivery cannot be given.

PARANITRANILINE continues scarce and firm.

PHTHALIC ANHYDRIDE is in good supply and price is easier.

Coal Tar Products

There is very little change in our market since last week.

BENZOL 90 PER CENT. is worth 2s. 11d. on rails.

PURE BENZOL.—The price for this is 3s. 3d. per gallon.

CREOSOTE OIL is in good demand, and the price remains at 1s. to 1s. 1d. in the North, with 1s. 1d. to 1s. 2d. in the South.

CRESYLIC ACID is firm at 4s. 6d. to 4s. 9d. for Pale 97/99 per cent., with 4s. per gallon for the Dark 95/97 per cent. quality.

SOLVENT NAPHTHA is slightly firmer at 3s. 3d. per gallon.

HEAVY NAPHTHA.—The price is still about 3s. 6d. per gallon. but supplies are difficult to obtain.

NAPHTHALENE.—There is a very good demand, but supplies are very difficult to obtain, manufacturers being very fully sold. Crude is worth from £16 to £20 per ton, while Refined is worth from £42 to £47 per ton.

PITCH.—The position is unchanged, the demand remains satisfactory and prices are maintained.

Sulphate of Ammonia

The demand for Home trade remains strong, and the inquiry for export is somewhat improved.

Current Prices

Chemicals

	per	£	s	d.		£	s.	d.
Acetic anhydride	lb.	0	3	6	to	0	3	9
Acetone oil	ton	90	0	0	to	95	0	0
Acetone, pure	ton	120	0	0	to	25	0	0
Acid, Acetic, glacial, 99-100%	ton	110	0	0	to	115	0	0
Acetic, 80% pure	ton	90	0	0	to	92	10	0
Arsenic	ton	100	0	0	to	105	0	0
Boric, cryst.	ton	74	10	0	to	76	0	0
Carbolic, cryst. 39-40%	lb.	0	1	3	to	0	1	3½
Citric	lb.	0	5	6	to	0	5	9
Formic, 80%	ton	115	0	0	to	120	0	0
Gallic, pure	lb.		8	6	to	0	8	9
Hydrofluoric	lb.	0	0	7	to	0	0	8
Lactic, 50 vol.	ton	60	0	0	to	62	0	0
Lactic, 60 vol.	ton	72	10	0	to	75	0	0
Nitric, 80 Tw.	ton	41	0	0	to	44	0	0
Oxalic	lb.	0	2	11	to	0	3	0
Phosphoric, 1.5	ton	65	0	0	to	67	0	0
Pyrogallic, cryst	lb.	0	11	6	to	0	11	9
Salicylic, Technical	lb.	0	2	10	to	0	3	0
Salicylic, B.P.	lb.	0	3	8	to	0	3	10
Sulphuric, 92-93%	ton	8	0	0	to	8	10	0
Tannic, commercial	lb.	0	5	0	to	0	5	3
Tartaric	lb.	0	4	0	to	0	4	2
Alum, lump	ton	19	10	0	to	20	0	0
Alum, chrome	ton	93	0	0	to	95	0	0
Alumino ferric	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15%	ton	17	10	0	to	18	10	0

	per	£	s.	d.		£	s.	d.
Aluminium, sulphate, 17-18%	ton	20	10	0	to	21	10	0
Ammonia, anhydrous	lb.	0	2	2	to	0	2	4
Ammonia, .880	ton	52	0	0	to	57	0	0
Ammonia, .920	ton	42	0	0	to	46	0	0
Ammonia, carbonate	lb.	0	0	7½	to		—	
Ammonia, chloride	ton	115	0	0	to	120	0	0
Ammonia, muriate (galvanisers)	ton	60	0	0	to	65	0	0
Ammonia, nitrate	ton	60	0	0	to	65	0	0
Ammonia, phosphate	ton	130	0	0	to	135	0	0
Ammonia, sulphocyanide	lb.	0	2	3	to	0	2	6
Amyl, acetate	ton	410	0	0	to	420	0	0
Arsenic, white, powdered	ton	70	0	0	to	75	0	0
Barium, carbonate	ton	14	10	0	to	15	0	0
Carbonate, 92-94%	ton	14	10	0	to	15	0	0
Barium, chlorate	lb.	0	1	0	to	0	1	1
Chloride	ton	33	0	0	to	35	0	0
Barium, Nitrate	ton	55	0	0	to	56	0	0
Sulphate, blanc fixe, dry	ton	25	10	0	to	26	0	0
Sulphate, blanc fixe, pulp	ton	15	10	0	to	16	0	0
Bleaching powder, 35-37%	ton	18	0	0	to		—	
Borax crystals	ton	41	0	0	to	42	10	0
Calcium acetate, Brown	ton	20	0	0	to	21	0	0
,, ,, Grey	ton	35	0	0	to	37	10	0
Calcium Carbide	ton	30	0	0	to	32	0	0
Chloride	ton	9	10	0	to	10	10	0
Carbon bisulphide	ton		—		to		—	
Casein, technical	ton	80	0	0	to	83	0	0
Cerium oxalate	lb.	0	3	9	to	0	4	0
Chromium acetate	lb.	0	1	2	to	0	1	4
Cobalt acetate	lb.	0	8	0	to	0	8	3
Oxide, black	lb.	0	10	0	to	0	10	3
Copper chloride	lb.	0	1	3	to	0	1	6
Sulphate	ton	44	0	0	to	45	0	0
Cream Tartar, 98-100%	ton	295	0	0	to	300	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde 40% vol.	ton	345	0	0	to	350	0	0
Formusol (Rongalite)	lb.	0	4	0	to	0	4	3
Glauber salts	ton	Nominal.						
Glycerine, crude	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	8	to	0	2	9
Iron perchloride	ton	50	0	0	to	52	0	0
Iron sulphate (Copperas)	ton	4	15	0	to	5	0	0
Lead acetate, white	ton	90	0	0	to	92	10	0
Carbonate (White Lead)	ton	70	0	0	to	72	10	0
Nitrate	ton	72	0	0	to	75	0	0
Litharge	ton	62	10	0	to	65	0	0
Lithopone, 30%	ton	56	0	0	to	58	0	0
Magnesium chloride	ton	15	10	0	to	16	10	0
Carbonate, light	cwt	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial)	ton	14	0	0	to	14	10	0
Sulphate (Druggists')	ton	18	10	0	to	19	10	0
Manganese, Borate	ton	190	0	0	to		—	
Sulphate	ton	105	0	0	to	110	0	0
Methyl acetone	ton	95	0	0	to	100	0	0
Alcohol, 1% acetone	gall.		Nominal.					
Nickel ammonium sulphate, single salt	ton	60	0	0	to	62	0	0
Nickel ammonium sulphate, double salt	ton	62	0	0	to	64	0	0
Potassium bichromate	lb.	0	2	2	to	0	2	3
Potassium Carbonate, 90%	ton	115	0	0	to	120	0	0
Chloride	ton	Nominal.						
Chlorate	lb.	0	0	10	to	0	0	10½
Meta-bisulphite, 50-52%	ton	270	0	0	to	280	0	0
Nitrate, refined	ton	70	0	0	to	72	0	0
Permanganate	lb.	0	5	9	to	0	6	0
Prussiate, red	lb.	0	5	3	to	0	5	6
Prussiate, yellow	lb.	0	2	3	to	0	2	4
Sulphate, 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt.	5	15	0	to		—	
Seconds	cwt.	6	0	0	to		—	
Sodium acetate	ton	61	0	0	to	63	0	0
Arsenate, 45%	ton	60	0	0	to	62	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	1	11	to	0	2	0
Bisulphite, 60-62%	ton	50	0	0	to	52	10	0
Chlorate	lb.	0	0	5¾	to	0	0	6¼
Caustic, 70%	ton	45	0	0	to		—	
Caustic, 76%	ton	46	0	0	to		—	
Hydrosulphite, powder, 85%	lb.	0	4	0	to	0	5	0
Hyposulphite, commercial	ton	37	10	0	to	40	0	0
Nitrite, 96-98%	ton	100	0	0	to	105	0	0
Phosphate, crystal	ton	40	0	0	to	42	0	0
Perborate	lb.	0	2	2	to	0	2	4
Prussiate	lb.	0	1	6	to	0	1	7
Sulphide, crystals	ton	30	0	0	to	32	0	0
Sulphide, solid, 60-62%	ton	62	10	0	to	65	0	0
Sodium Sulphite, cryst.	ton	15	10	0	to	16	10	0
Strontium carbonate	ton	85	0	0	to	90	0	0
Nitrate	ton	90	0	0	to	95	0	0
Sulphate, white	ton	8	10	0	to	10	0	0
Sulphur chloride	ton	42	0	0	to	44	10	0
Sulphur, Flowers	ton	24	0	0	to	26	0	0
Roll	ton	24	0	0	to	26	0	0
Tartar emetic	lb.	0	3	4	to	0	3	5
Tin perchloride, 33%	lb.	0	2	6	to	0	2	7
Perchloride, solid	lb.	0	3	0	to	0	3	3
Protochloride (tin crystals)	lb	0	2	0	to	0	2	1
Zinc chloride, 102 Tw.	ton	22	0	0	to	23	10	0
Chloride, solid, 96-98%	ton	60	0	0	to	65	0	0
Oxide, 99%	ton	82	10	0	to	85	0	0
Oxide, 94-95%	ton	70	0	0	to	72	10	0
Dust, 90%	ton	90	0	0	to	92	10	0
Sulphate	ton	21	10	0	to	23	10	0

Coal Tar Intermediates, &c.

	per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	4	0	to	0	4	3
Alphanaphthol, refined	lb.	0	5	3	to	0	5	6
Alphanaphthylamine	lb.	0	4	0	to	0	4	3
Aniline oil, drums extra	lb.	0	1	8	to	0	1	9
Aniline salts	lb.	0	1	10	to	0	2	0
Anthracene, 85-90%	lb.		—		to		—	
Benzaldehyde (free of chlorine)	lb.	0	5	6	to	0	6	0
Benzidine, base	lb.	0	12	6	to	0	13	6
Benzidine, sulphate	lb.	0	10	0	to	0	11	0
Benzoic, acid	lb.	0	5	6	to	0	6	0
Benzoate of soda	lb.	0	5	6	to	0	6	0
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	1	6	0	to	1	7	6
Betanaphthol	lb.	0	5	6	to	0	5	9
Betanaphthylamine, technical	lb.	0	10	6	to	0	11	6
Croceine Acid, 100% basis	lb	0	5	0	to	0	6	3
Dichlorbenzol	lb.	0	0	6	to	0	0	7
Diethylaniline	lb.	0	7	9	to	0	8	6
Dinitrobenzol	lb.	0	1	5	to	0	1	6
Dinitrochlorbenzol	lb.	0	1	5	to	0	1	6
Dinitronaphthaline	lb.	0	1	4	to	0	1	6
Dinitrotoluol	lb.	0	1	8	to	0	1	9
Dinitrophenol	lb.	0	2	3	to	0	2	6
Dimethylaniline	lb.	0	5	0	to	0	5	6
Diphenylamine	lb.	0	5	0	to	0	5	3
H-Acid	lb.	0	14	6	to	0	15	0
Metaphenylenediamine	lb.	0	5	9	to	0	6	0
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	7	6	to	0	8	6
Monosulphonic Acid (2:7)	lb.	0	7	6	to	0	8	0
Naphthionic acid, crude	lb.	0	5	6	to	0	6	0
Naphthionate of Soda	lb.	0	6	0	to	0	6	6
Naphthylamin-di-sulphonic-acid	lb.	0	5	6	to	0	6	6
Nitronaphthaline	lb.	0	1	3	to	0	1	4
Nitrotoluol	lb.	0	1	4	to	0	1	6
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	2	to	0	1	4
Orthotoluidine	lb.	0	2	6	to	0	2	9
Orthonitrotoluol	lb.	0	1	7	to	0	1	8
Para-amidophenol, base	lb.	0	15	0	to	0	16	0
Para-amidophenol, hydrochlor	lb	0	15	6	to	0	16	6
Paradichlorbenzol	lb.	0	0	6	to	0	0	8
Paranitraniline	lb.	0	8	6	to	0	9	0
Paranitrophenol	lb.	0	2	6	to	0	2	9
Paranitrotoluol	lb.	0	5	3	to	0	5	6
Paraphenylenediamine, distilled	lb.	0	13	6	to	0	14	6
Paratoluidine	lb.	0	8	6	to	0	9	6
Phthalic anhydride	lb.	0	5	0	to	0	5	3
R. Salt, 100% basis	lb.	0	4	0	to	0	4	2
Resorcin, technical	lb.	0	11	6	to	0	12	6
Resorcin, pure	lb.	0	17	6	to	1	0	0
Salol	lb.	0	5	9	to	0	6	0
Shaeffer acid, 100% basis	lb.	0	3	6	to	0	3	0
Sulphanilic acid, crude	lb.	0	1	5	to	0	1	6
Tolidine, base	lb.	0	10	6	to	0	11	6
Tolidine, mixture	lb.	0	3	0	to	0	3	6

MAJOR & CO.—A dividend has been declared of 10 per cent. (2s. 3d. per share) and bonus, free of tax, of 5 per cent. (1s. per share) on the deferred ordinary shares for the year; 2 per cent. (4 4-5d. per share) on the preferred ordinary shares, making a total of 9 per cent. for the year on the old issue and at the same rate for seven months on the new issue; £5,000 has been placed to general reserve; £3,500 to reserve for depreciation; £6,512 written off expenses of new issue; leaving £11,445 forward.

Company News

NITRATE RAILS.—£1,268 increase is reported for the period June 16-30.

LIBIOLA COPPER MINING CO.—The accounts for 1919 show a net loss of £3,696, against a profit of £1,819 for the previous year.

EVANS, SON, LESCHER & WEBB.—The directors have declared an interim dividend on the ordinary shares at the rate of 10 per cent. for the half-year ended June 30.

NEW TRANSVAAL CHEMICAL.—Interim dividends have been declared for the half-year to December 31 last of 3 per cent. less tax, on the cumulative first preference shares and of 4 per cent., less tax, on the cumulative A preference shares.

ROYAL DUTCH PETROLEUM.—N. M. Rothschild & Sons announce that the final dividend for the year 1919 has been declared at 30 per cent., payable on the 9th inst. The distribution for the whole year 1919 is 45 per cent. against 40 per cent. for 1918.

LEVER BROTHERS.—The scheme for the reorganisation of capital has been approved by the shareholders, and the former first A B and C preference shares have now been converted into seven per cent. preference shares, and the former fifteen per cent. and fifteen per cent. A preferred ordinary shares into eight per cent. A preference shares.

ENGLISH MARGARINE WORKS.—Presiding at the first annual meeting of English Margarine Works (1919), Ltd., in Liverpool last week, Mr. W. G. Lovell (chairman), in moving the adoption of the report and accounts said the net profit amounted to £105,311 which would have been £128,987 had the whole of the capital been subscribed at the outset. The balance of £23,676 had to be paid away for interest on loans.

INDO-BURMA OILFIELDS (1920).—The directors, in a brief report to the shareholders, state that orders have been placed for the whole of the machinery for the Yenangyaung well sites, and shipment of some of the material has already been made. It is anticipated that the whole of the equipment will be on the field by the end of the year. Drilling of several wells will probably begin in the early autumn of this year.

HENDERSON'S TRANSVAAL ESTATES.—The net profit for the year ended March 31 amounted to £45,892. A dividend is recommended at the rate of 6 per cent., less tax, for the year, calculated on the amounts for the time being paid up, or credited as paid up, on the shares. £5,000 has been placed to reserve (raising it to £45,000), and £47,103 is carried forward, against £43,478 brought in.

ROPP TIN.—The profit for the year ended December 31, after writing off £1,519, the expenses of the new capital issues, amounted to £55,147 (against £52,150 in 1918), to which is added £19,580 brought forward. It is proposed to pay a final dividend of 10 per cent., less tax, making 50 per cent. for the year (against 75 per cent.) leaving to be carried forward, subject to income-tax, £14,327. During the year the issue of £30,000 six per cent. first mortgage debentures has been further reduced to £5,920, and the loan of £20,000 to £4,000. The balance of the second debentures, amounting to £15,000 has been paid.

HARGREAVES BROTHERS & CO., LTD.—This company are inviting public subscriptions at par for 200,000 8 per cent. cumulative preference shares of £1 each. The company, who are makers of Gipsy blacklead, "Linoleo," "Glosso," "Pynka," "Zog," &c., have an authorised capital of £1,000,000, divided into £500,000 8 per cent. cumulative preference, £100,000 10 per cent. non-cumulative preferred ordinary, £150,000 deferred ordinary, and £250,000 other shares. All the deferred ordinary, £50,000 of the preferred ordinary, and £122,000 of the preference shares have been issued and paid up. The subscription list will close on or before July 12.

ELECTRO BLEACH AND BY PRODUCTS.—In moving the adoption of the report and accounts at the sixth general meeting in Manchester last week Sir Halford Mackinder (the chairman) who presided stated that the exchange of shares with Brunner, Mond & Co., Ltd., had now been carried through, and that, the owners of only 125 shares out of the 400,000 issued shares of the company had refused the offer made to them, though there were a few additional shareholders who had not yet replied. He was convinced that the success of the company was not due to the peculiar circumstances of the war, and was confident that the company would have been just as prosperous, or even more prosperous, had there been no war.

LEVANT TIN MINES.—The statutory report states that the total number of shares allotted is 240,000 of 10s. each, of which 120,000 have been issued for cash (2s. 6d. called up), the balance of 120,000 shares having been allotted as fully paid—40,000 in part consideration of the purchase of the property; 20,000 in consideration of £10,000 cash paid to the vendors by the Geevor Tin Mines, Ltd., in part consideration of the purchase of the property; 10,000 in satisfaction of registration and preliminary expenses, &c., and 50,000 in consideration of the Geevor Tin Mines, Ltd., or its nominees providing the working capital for the company and the cash consideration for the vendors. The total amount of cash received in respect of the shares issued wholly for cash is £15,200. The preliminary expenses are £5,000.

ALUMINIUM CORPORATION, LTD.—At the tenth general meeting in London, last week, Mr. S. G. Bibby, presided in the unavoidable absence of the chairman, Mr. Kenneth M. Clark. Although the production of aluminium had been greatly increased during the war, particularly in America and Norway, the demand, Mr. Bibby stated, had kept pace with the supply, and they had found no difficulty in disposing of their output. With regard to the future, supplies of raw material seemed to be the greatest difficulty. There was a possibility of the French Government placing an export duty on bauxite, the company's chief raw material, in which case they would be obliged to interest themselves in the considerable deposits of this ore known to exist in the British Empire. The board had at present under consideration certain negotiations in this direction.

MANGANESE BRONZE AND BRASS.—The balance of profit and loss brought forward from the year 1918 was £45,615, and the trading for 1919, after meeting all working and establishment charges, but omitting the company's outstanding claim against the Government for 1919, has resulted in a loss of £25,191, leaving £20,424. After making provision for depreciation of St. George's lease and buildings, £350, and paying the dividend on the preference shares, £10,125, there remains £9,949, which for the present the directors propose to carry forward. The loss on the year's trading is chiefly due to the dislocation following the transition from war to peace, to the further rises in wages, and the moulder's strike, which lasted nearly four months. The directors look forward with confidence to a much improved result for 1920, provided manufacture is not again affected by labour troubles.

LAGUNAS NITRATE.—Presiding at the annual meeting in London on Monday Mr. R. E. Morris, stated that the need for nitrate of soda for all countries had never been so obvious, and although many difficulties—due to the aftermath of the war—might restrict the consumption for next season and possibly the following one, everything pointed to a steady, continuous extension of the use of the commodity if not at to-day's prices, which were certainly high, at any rate at a figure which should yield a fair profit to most of the producers. The report was adopted, and a dividend of 2s. per share, free of tax, was declared. For the year 1919 the gross profit, including interest on investments and bank deposit and transfer fees, amounted to £32,014. After deducting the usual administration charges and providing for depreciation on investments and income-tax, the net profit is £14,244.

"SHELL" TRANSPORT.—It is announced that an arrangement has been arrived at between the Shell Transport interests and a Spanish bank syndicate for the formation of a company which is to establish a number of oil depots in Spanish ports. The capital of the company, according to the Madrid *Economonista*, is fixed at 25 million pesetas (nominally £1,000,000), of which the Shell group will furnish 55 per cent. The annual meeting was held on Monday under the presidency of Sir Marcus Samuel. After giving a detailed account of the work of the year and the developments in the Company's properties abroad, the chairman said he had found it necessary to retire from the board of the Bataafsche Petroleum Maatschappij, since it was impossible for him to continue to journey to Holland every month, as was necessary for directors undertaking that post, and the time was approaching when he hoped to be able to relinquish the post as chairman of this company. The weight of this gigantic business must be carried by younger shoulders, and he knew that every member of the board would have great confidence in his son, Captain Samuel, who would, he hoped, succeed him.

Catalogues Received

Cookson & Co., Ltd.

Messrs. Cookson's illustated catalogue is an artistic production, and in addition to giving valuable information regarding the firm's lead and antimony manufactures, it contains an interesting account of the history of the firm which dates back to 1704. An edition is printed in French and one in Spanish is in course of preparation. The company announce an entirely new departure in the production of sheet lead and lead pipe for chemical purposes. By a new process of super-refinement lead is obtained of quite exceptional purity showing highly resistant properties in heating tests with the various common acids and mixtures. Its flash point with H_2SO_4 conc. is 300-315°C. This lead is not the usual product placed on the market under the name of "chemical lead." They also specialise in the manufacture of "high pressure" antimonial lead pipes for use in chemical plant where high pressures are encountered. "Timonox," Cookson's oxide of antimony in pigment form, is highly recommended.—Newcastle-on-Tyne.

The Vaughan Crane Co., Ltd.

Particulars of the Vaughan Electric Block (Patent) are furnished in Booklet No. 7 received from this firm. The blocks, which are standardised in three frame sizes, each of which is supplied in two or more reevings of rope to suit different maximum loads, meet the need for a reliable self-contained and power-driven hoist, which can be slung up anywhere ready for instant use on the connection of a flexible supply cable. The blocks can be supplied with a top suspension hook for hanging on to an existing structure, or fitted to a trolley for travelling on the bottom flange of an overhead "I" section runway track.—Openshaw, Manchester.

Thompson & Capper, Ltd.

Thompson & Capper, Liverpool, are the sold agents in Great Britain for F. J. Stokes Machine Co., manufacturers of pharmaceutical, chemical and confectioners' machinery and apparatus, Philadelphia, Pa. This company manufacture all the machines required for the production of tablets and compressed material —sifters, mixers, drying closets, drug mills, jacketed kettles, coating pans, polishing machines, &c. Rotary tablet machines are recommended in most cases. The "B" rotary is the standard pharmaceutical size, and the "D" is used for compressing the larger sizes of tablets which require a very heavy pressure, such as sugar candies, lozenges and chemicals. When the output required is small, the "N" and "O" machines are more economical. The Stokes Automatic Water Still is a clever construction, for which the following advantages are claimed: (1) It utilises the heat generated by the condensation of the steam for pre-heating the incoming water to the boiling point, and thus a small quantity of steam will operate the still, (2) by pre-heating the feed water before it enters the distilling basin, the ammonia and other gases dissolved in the raw water are liberated and escape to the air through an opening provided for this purpose; (3) the condenser tubes extend to the extreme top of the steam space, high above the water level, so there is no danger of the raw water being carried over by the steam; (4) the still can be easily cleaned by opening the valve connecting with the drain and flushing, or by removing the lid at the top and scrubbing. The copper steam coil can also be easily disconnected for the removal of scale in case any is deposited by the feed water.—Manesty Buildings, College Lane, Liverpool.

Glass Bottle Contract

On Thursday, July 1, in the King's Bench Division, Mr. J. Rowlett delivered his reserved judgment in the action by the Chemists' Manufacturing Co., Ltd., against M. Owen, Manchester, for damages for non-performance of a contract for supply of chemical bottles. His Lordship held that there was no contract here at all, and the action failed and must be dismissed with costs.

A Giant Blast Furnace

The Ebbw Vale Steel Company is erecting a blast furnace which, it is said, will be the largest in the world. The cost of the furnace is estimated at approximately £1,000,000, and an output of 3,000 tons a week is looked for.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Order Made on Application for Discharge

INGHAM, THOMAS, Pendre House, Holywell, Flintshire, chemical manufacturer. Discharge suspended until a dividend of not less than 10s. in the pound has been paid to the creditors. Date of order, June 8, 1920.

Companies Winding Up Voluntarily

SPECIAL STEEL CO., LTD.—Liquidator, W. Lloyd, Priory Street, Dudley.

ORMSIDE CHEMICAL CO., LTD.—Liquidator, Mabel Campbell.

V.C. GLASS MANUFACTURING CO., LTD. (In Voluntary Liquidation).—A meeting of creditors will be held at the office of W. Bayly Ransom, Solicitor, 52, Queen Victoria Street, London, E.C., on Monday, July 19, at 3 p.m. E. H. Hawkins and L. Gordon Mellor, Liquidators.

RECORD OIL & GREASE CO., LTD. (In voluntary liquidation).—A meeting of creditors will be held at the offices of Shuttleworth & Haworth, Lloyds Bank Buildings, King Street, Manchester, on Thursday, July 15, at 3 p.m. Creditors claims on or before July 12 to the Liquidator, Alfred Shuttleworth, Lloyds Bank Buildings, King Street, Manchester. This notice is given to comply with the requirements of the Companies Acts. All creditors will be paid in full.

Liquidators' Notices

LONDON OIL TRUST, LTD. (In liquidation).—A general meeting of members will be held at 20, Eastcheap, London, E.C. 3, at 2.30 p.m. on Tuesday, August 3. J. P. Eyland, Liquidator.

MEXICAN OIL CORPORATION, LTD. (In liquidation).—A general meeting of members will be held at 20, Eastcheap, London, E.C. 3, at 2 p.m., on Tuesday, August 3. G. Steele, Liquidator.

LONDON PHARMACEUTICAL REFINERS, LTD.—A meeting of creditors will be held at 95, Cannon Street, London, E.C. 4, on Saturday, July 17, at 11 a.m. C. J. Gladwell, Liquidator.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, created after July 1, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.*]

BRITISH METALS EXTRACTION CO., LTD., London, E.C.—Registered June 23, £4,000 second debenture, to the Hon. G. W. P. Winn, 31, Montagu Square, W., and others; general charge, except patents and secret processes. *£48,000. January 14, 1920.

BRITISH MICA CO., LTD., Wandsworth, S.W.—Registered June 23, £1,500 debentures (filed under sec. 93 (3) of the Companies (Consolidation) Act, 1908), present issue £700; general charge. *Nil. April 15, 1920.

ENGLISH CHINA CLAYS, LTD., St. Austell.—Registered June 25, mortgage or charge (supplemental to agreement for mortgage dated July 3, 1919), securing £16,000, to J. B. Fortescue, Boconnoc (Cornwall); charged on lands. *Nil. April 29, 1920.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

STANSFIELD, J. L., Boothfold, Waterfoot, Lancs., chemical manufacturer, £10 13s. 7d. April 20.

BREEN, E., Balls Pond Road, Middlesex, chemist, £18 17s. May 25.

LLEWELLYN, WILLIE, 135, Dunraven Street, Tonypandy, chemist, £18 2s. 8d. May 28.

New Companies Registered

The following have been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lane, London, W.C. :—

ARTHUR LUMB & SONS, LTD., Atlas Oil Works, Mount Street, Halifax.—Oil and petroleum manufacturers. Nominal capital, £15,000 in 5,000 preference shares and 10,000 ordinary shares of £1 each. Directors: W. Lumb, 14, Lemington Avenue, Halifax; H. S. Lumb, Roadside, Ogden, Halifax; J. L. Lumb, 5, Milton Place, Halifax; G. Bennett, 211, Drake Street, Rochdale; J. Scholes, "Beech Mount," Manchester Road, Rochdale; S. Sutcliffe, Murley Moss, Halifax. Qualification of directors, £100.

BEAVER SYNDICATE, LTD.—Petroleum and other mineral oils. Nominal capital, £10,000 in 10,000 shares of £1 each. Directors to be appointed by subscribers. Subscriber, L. F. Callingham, 1, New Square, Lincoln's Inn, W.C.

BRITANNIA FERTILISER CO., LTD., 76, High Street, Slough, Bucks.—To manufacture all kinds of fertilisers and manures. Nominal capital, £3,000 in 3,000 shares of £1 each. Directors: Col. W. N. Davis, Salt Hill House, Slough; S. R. Blaksome, 74, High Street, Slough; A. Hammond, Boxted, Wellington Street, Slough; E. L. Reynolds, The Gabled House, Barnham Common, Bucks. Qualification of directors, 1 share.

COLLOID DUST TREATMENT CO., LTD.—To acquire interests in any invention in relation to the treatment of dust in mines and tunnels, &c. Nominal capital, £2,500 in 500 shares of £5 each. Directors: W. E. K. Webb, Gorse Hill, Helsby; C. W. Morgan, The Mount, Llandaff, Mon. Qualification of directors, £250.

C.O.M., LTD., 5, Chancery Lane, W.C.—Chemists and druggists. Nominal capital, £20,000 in 200 shares of £100 each. Directors to be appointed by subscribers. Qualification of directors, £100.

DERRY CHEMICAL CO., LTD., North Western Mercantile Buildings, East Parade, Leeds.—Consulting, analytical and manufacturing chemists. Nominal capital, £500 in 500 shares of £1 each. Directors: D. R. Watson, 161, Otley Road, Leeds; J. K. Watson, 159, Otley Road, Leeds. Qualification of directors, £10.

HARVEY & FARMER, LTD., 18A, Abercromby Square, Liverpool.—Dealers in chemicals, oils and colours. Nominal capital, £5,000 in 5,000 shares of £1 each. Directors: H. Harvey, 16A, Abercromby Square, Liverpool; F. Q. Farmer, The Nook, Berkswell, Coventry; T. D. Hoyle, Carrfield, Luddenden, S.O. Yorks; J. H. Sutcliffe, Carrfield, Luddenden, S.O. Yorks. Qualification of directors, £50.

MATTHEWS LABORATORIES, LTD., 30, The Mall, Clifton, Bristol.—Chemists and druggists. Nominal capital, £25,000 in 24,000 participating cumulative preference shares and 1,000 ordinary shares of £1 each. Directors: H. E. Matthews, The Mall, Pharmacy, Clifton, Bristol (managing director); C. H. Vernon, 38, Holborn Viaduct, E.C.; A. Searle, Gaerwood, Maindee, Newport, Mon. Qualification of directors, £500 in preference shares and £1 in ordinary shares. Remuneration of directors, £300, to be divided.

OPENSHAW & CO. (BLACKBURN), 30, Simmons Street, Blackburn.—Manufacturing chemists, &c. Nominal capital, £5,000 in 5,000 shares of £1 each. Directors: J. Ward, 124, Whalley New Road, Blackburn; W. Dobson, 6, Maple Street, Blackburn; P. Fielding, Alderley, Pleckgate Road, Blackburn. Qualification of directors, 500 shares.

PICKLENE SYNDICATE, LTD., Winchester House, Old Broad Street, E.C.—Dealers in chemical preparations for pickling metals. Nominal capital, £2,000 in 450 "A" shares and 1,550 "B" shares of £1 each. Directors: F. V. Lister, 107, Castlenau, W. 13; B. Hamilton, 68, Philbeach Gardens, S.W. Qualification of directors, 1 share. Remuneration of directors, 10 per cent. of net profits.

PHŒNIX OIL & TRANSPORT CO., LTD. (June 24, 1920.)—Oil Refiners. Nominal capital, £1,050,000 in 1,000,000 shares of £1 each and 1,000,000 shares of 1s. each. Minimum subscription, 7 shares. Directors to be appointed by subscribers. Qualification of directors, 1,000 shares. Remuneration of directors, £150 each; chairman, £1,000. Subscribers: Petroleum & Industrial Trust, Ltd., 54, New Broad Street, E.; A. Lidgett, "Brookside," Beckenham, Kent; and five others.

Dispute Over Saccharine Contract

IN the King's Bench Division on Friday, July 2, Mr. Justice Avory had before him an action brought by Austin Baldwin & Co., Incorporated, of New York, claiming damages as buyers of a large quantity of saccharine for breach of contract. The defendants were Wilfred Turner & Co., Ltd., of 30, Craven Street, Strand, and it was alleged that they refused to accept delivery of 500 lb. of Monsanto Saccharine monthly from January 1919. The price was fixed at 11 dollars per lb. f.o.b. New York. The defence was that owing to the restrictions imposed by the United States and British Governments the defendants were unable to get licences either for export from America or import to England and that they repudiated the contract.

After hearing legal arguments, his Lordship in giving judgment said the claim was for damages against the defendants for refusal to accept delivery of saccharine. In answer there were raised three defences: first that there was no concensus of the arrangement or rather that the parties were not *ad idem* and there was no completed contract. In the second place, they said if there was a completed contract there was what was called frustration of the commercial venture by events which subsequently happened and which relieved the defendants of their liability. Thirdly, the defendants pleaded the protection of the Emergency Powers Act of 1917, which dealt with the non-fulfilment of contracts due to the compliance on the part of the defendants with certain restrictions of the Government. In regard to the first point, he had no evidence that the parties were not *ad idem*, whilst in the correspondence he found that the defendants took the whole risk of getting the requisite licenses. There was also no evidence that the contract was made illegal by reason of any restrictions in the United States by statute or proclamation and the defence failed. On the second defence he could not agree that there was any frustration of the venture, and, finally, on the third point he thought that the defendants could have fulfilled the contract after the American restriction was withdrawn of December 20, 1918. Therefore, there must be judgment for the plaintiffs for an agreed amount of £6,315, with costs.

A stay of execution was granted.

BRUNNER, MOND & CO.—At an extraordinary general meeting held, under the chairmanship of Mr. Roscoe Brunner, on Tuesday, in Liverpool, the following resolution was adopted unanimously:—"That the proviso added to clause 7 of the company's articles of association by the special resolution passed on June 9, 1916, and confirmed on June 27, 1916, be and the same is hereby cancelled, and that the 200,000 ordinary shares each of £1 issued to the Castner-Kellner Alkali Company, Limited, pursuant to the same proviso, carrying the rights and subject to the restrictions provided for by the agreement dated May 18, 1916, therein referred to, and the 300,000 ordinary shares each of £1 issued to the same company with and subject to the like rights and restrictions, and forming part of the 4,646,805 shares distributed among the members pursuant to the ordinary resolution No. 2 passed at the extraordinary general meeting of the company held on February 20, 1918 (which said 500,000 shares are numbered from 6,826,106 to 7,326,105), be no longer subject to the restrictions provided for by the said agreement dated May 18, 1916, and that all such shares carry henceforth the like rights in all respects as the remaining ordinary shares of the company."

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